THE LANCET

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

Telegrams—LANCET, WESTRAND LONDON. *Telephone*—GERRARD 4314 & 4315. *Offices*—423, Strand, London, W.C.

No. IX. OF VOL. II., 1928.
No. 5479. Vol. CCXV.

LONDON, SATURDAY, SEPTEMBER 1, 1928
Founded 1823. Registered as a Newspaper. Published Weekly.

Pp. 120—Price 1s.
Annual Subscription
Inland £2 2s. Abroad £2 10s.

IN THE PRESS
The FOURTH (1928) VOLUME of
MODERN TECHNIQUE IN TREATMENT.
Important Announcement.
See pages 6, 7 & 8.
London: THE LANCET, Ltd., 1, Bedford Street, W.C.2.
Sole Agents for India: Butterworth and Co.

OXFORD MEDICAL PUBLICATIONS.
SEE PAGE 2.

ON THE BREAST.
By DUNCAN C. L. FITZWILLIAMS, C.M.G., M.D., Ch.M., F.R.C.S. Ed. and Eng.
Royal 8vo. 456 pp. 2 Plates, 166 Illustrations. 30s. net.
LANCET.—"The book is packed with accurate clinical observations and bears evidence throughout of extensive clinical experience and wide reading on the part of the author."
Wm. Heinemann (Medical Books) Ltd., 99, Great Russell Street, London, W.C.1.

NOW READY. 4/6 net.
THE TREATMENT OF
CHRONIC DEAFNESS
BY THE ELECTROPHONOÏDE METHOD OF ZUND-BURGUET.
By GEORGE C. CATHCART, M.A., M.D.,
Consulting Surgeon to the Throat Hospital, Golden-square.
Oxford University Press, Amen House, London, E.C.4.

BY C. HAMILTON WHITEFORD, M.R.C.S., L.R.C.P.
SURGICAL "DONT'S" (AND "DO'S"). SECOND (ENLARGED) EDITION. 1928. Price 4s. net.
Racy, readable and short.—BRISTOL MED. CHIR. JNL.
ACUTE APPENDICITIS. Price 4s. net.
London: Harrison & Sons, Ltd., 44-47, St. Martin's Lane, W.C.2.

OPHTHALMIC SURGERY
including the Author's
OPERATION FOR IMMATURE CATARACT.
By V. NESFIELD, F.R.C.S. Eng., Major I.M.S. (retired), Ophthalmic Surgeon, The Queen's Hospital for Children, London, E.
Demy 8vo, with illustrations. 9s., postage 6d.
H. K. Lewis & Co. Ltd., 28 Gower Place, W.C. 1.

JUST PUBLISHED. With 25 Illustrations including 17 Plates. Demy 8vo. 9s. net; postage 5d.
STERILITY IN WOMEN:
DIAGNOSIS AND TREATMENT.
By SYDNEY FORSDIKE, M.D., B.S.(Lond.), F.R.C.S.(Eng. and Edin.), Surgeon to the Hospital for Women, Soho Square, London; Gynæcological Surgeon to the Kensington, Fulham and Chelsea Hospital, etc.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C.1.

With 16 plates. Demy 8vo. 9s. net. Postage 5d.
PYELOGRAPHY:
ITS HISTORY, TECHNIQUE, USES AND DANGERS.
By ALEX. E. ROCHE, M.A., M.D., M.Ch., F.R.C.S.
With an Introduction by SIR JOHN THOMSON-WALKER, F.R.C.S.
". . . will be of great use . . . . an up-to-date treatise."—B. M. JNL.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C. 1.

NOW READY.
THIRD EDITION. Crown 8vo. 4s. net; postage 4d.
THE INJECTION TREATMENT OF
VARICOSE VEINS.
By A. H. DOUTHWAITE, M.D., M.R.C.P. (Lond.).
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C.1.

Second Impression. With Plate. 2s. 6d. net; postage 3d.
GASTRIC AND DUODENAL ULCER.
A Record of Ten Years' Experience. Two Lectures.
By Sir BERKELEY MOYNIHAN, Bart., K.C.M.G., C.B.
Bristol: John Wright & Sons Ltd. London: Simpkin.

NEURITIS AND NEURALGIA.
By
WILFRED HARRIS, M.D., F.R.C.P.,
Senior Physician to St. Mary's Hospital, and to the Hospital for Epilepsy and Paralysis, Maida Vale.
Cloth. Demy 8vo. 436 pages. Illustrated. Price 12s. 6d. net.
Oxford University Press, Amen House, London, E.C.4.

THIRD EDITION. With many Illustrations. 12s. 6d. net.
TREATMENT OF DISEASES OF THE SKIN.
By KNOWSLEY SIBLEY, M.A., M.D., B.Ch.(Camb.).
London: Edward Arnold & Co., 41 and 43, Maddox-street, W. 1.

DISEASES OF THE RECTUM AND COLON
AND THEIR SURGICAL TREATMENT.
BY
P. LOCKHART-MUMMERY,
F.R.C.S.ENG., M.A., M.B., B.C.CANTAB.,
Senior Surgeon to St. Mark's Hospital.
Over Two Hundred Plates and Illustrations. Price 25s.
Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

CANCER OF THE BREAST
AND ITS TREATMENT.
By W. SAMPSON HANDLEY, M.S., M.D. Lond., F.R.C.S. Eng.
Second Revised Edition. With 82 Illustrations. 30s. net.
Published for the Middlesex Hosp. Press by John Murray, London.

H. K. LEWIS & CO. LTD., MEDICAL PUBLISHERS AND BOOKSELLER
Text-Books and Works in Medical, Surgical, and General Science of all Publishers.
Special Stock of Medical Stationery. *Loose Leaf Books, Card Index Systems, Cabinets, &c.*
MEDICAL AND SCIENTIFIC CIRCULATING LIBRARY.
Annual Subscription, Town or Country, from One Guinea.
DETAILED PROSPECTUS, with List of recent additions, on application.
Telephone, on and after Sept. 1:—MUSEUM 7756 (three lines).
Large Stock of SECOND-HAND Books at greatly Reduced Prices at 140, Gower St. Telephone: Museum 4031.
136 & 140 GOWER STREET, and 24 & 28 GOWER PLACE, LONDON, W.C.1.

Felsol

Internal Treatment for ASTHMA

According to statistics the use of Felsol on patients suffering from Bronchial and Cardiac Asthma resulted in 80% of the cases having instant relief, and the return of asthmatic attacks was prevented in many of these by administering one or two powders a day. That is the evidence for Felsol.

Felsol is entirely free from narcotics. Cumulative doses are not necessary, neither does it produce injurious after-effects.

May we send you Formula, Free Clinical Sample and Literature?

BRITISH FELSOL CO. LTD., 29, Red Lion Square, W.C.1

"I shall be glad if you will send me by return if possible half a dozen boxes of Felsol. I have tried your sample in a severe case of Asthma with most beneficial results."
—M.B., Ch.B.(Edin.)

Extract from one of the many testimonials on file at our Registered Offices.

ZŌPLA STRAPPING IS ALWAYS READY FOR USE

It keeps without deterioration and is instantly self-adhesive.

It exerts a powerful grip and does not slip.

On various cloths and felts. WRITE FOR SAMPLES.

Manufacturers of the Original Holland Strapping.

LESLIES LTD., High St., WALTHAMSTOW, LONDON, E.17

VALENTINE'S MEAT-JUICE

In **Hospital** and **Private Practice** and **in their own persons** when ill, **Physicians** have **demonstrated** the **power** of **Valentine's Meat-Juice** to **Sustain** and **Strengthen** the weakened **Vital Forces** when the **Digestive Organs** are **Impaired.**

Debility, Exhaustion and Anaemia.

Dr. Julian Calleja, *Pres. Royal Academy of Medicine, Madrid, Spain:* "It is with the greatest pleasure that I inform you that I consider VALENTINE'S PREPARATION OF MEAT-JUICE to be of a very superior order for invigorating the nervous system, for which I use it myself, and prescribe it to my patients."

Ross H. Skillern, M. D., *Laryngologist Rush Hospital for Consumption, Philadelphia, Pa.:* "I, myself, had the misfortune to be seized with an attack of Cerebro Spinal Meningitis and after a critical illness recovered. My mainstay during the attack was VALENTINE'S MEAT-JUICE, and I can assure it materially aided in my recovery."

For Sale by European and American Chemists and Druggists.

VALENTINE'S MEAT-JUICE COMPANY

Richmond, Virginia, U. S. A.

A-34

VALENTINE'S PREPARATION
NUTRIO PER ME
VOLUME 1 4/5 OZ.
MEAT JUICE
The result of an Original Process of preparing Meat and extracting its Juice by which the elements of nutrition are obtained in a State ready for immediate absorption.
DIRECTIONS. Dissolve one teaspoonful of the Preparation in three tablespoonfuls of cold or warm water; boiling water changes the character of the preparation.

THE LANCET

No. 5479. LONDON, SATURDAY, SEPTEMBER 1, 1928. CCXV.

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

INGLEBY LECTURES
on Some Recent Advances in our Knowledge of Rickets and Allied Diseases. By LEONARD G. PARSONS, F.R.C.P. Lecture I. .. 433

ORIGINAL ARTICLES.
Carcinoma of Stomach. By A. J. WALTON, F.R.C.S. (*Illustrated*) 438
Syphilis of the Œsophagus. By A. LAWRENCE ABEL, F.R.C.S.—(*Illustrated*) .. 441
Skin Antisepsis with Iodine and Some New Solvents. By R. A. MACDONALD, M.B., D.P.H., and J. WICLIFFE PECK, F.C.S... 443

CLINICAL AND LABORATORY NOTES.
The So-called White Line of Adrenal Insufficiency. By A. MUIR CRAWFORD, M.D. 445
Non-Specific Protein Therapy in Erysipelas. By HENRY C. SEMON, M.R.C.P.—(*Illustrated*).. 446
A New Culture Medium. By C. Y. WANG, F.R.C.P. 446

MEDICAL SOCIETIES.
Royal Institute of Public Health: Dublin Congress.—Section of Bacteriology, Pathology, and Biochemistry, and Section of Child Welfare.... 447

REVIEWS AND NOTICES OF BOOKS.
From Magic to Science. By Charles Singer, F.R.C.P. 450
Some Principles of Diagnosis, Prognosis and Treatment. By Robert Hutchison, F.R.C.P..... 450
Childbirth. By William George Lee, M.D. 450
Gastro-intestinal Diseases. 451
Handbuch der biologischen Arbeitsmethoden. Edited by Prof. Emil Abderhalden 451
Bath Conference on Rheumatic Diseases 451
A Practical Botany for Matriculation. By Margaret A. Shuttleworth .. 451
Histological Technique. By B. F. Kingsbury, Ph.D., M.D., and O. A. Johannsen, Ph.D. 452
Die Klinische Hämatologie des Kindesalters. By Heinrich Baar and Eugen Stransky 452
Surgical Anatomy. By Grant Massie, F.R.C.S... 452

LEADING ARTICLES.
INOCULATION AGAINST ENTERIC FEVERS 453
THE LEGAL LIABILITY OF HOSPITALS 454
DENGUE IN ATHENS 454

ANNOTATIONS.
The Copenhagen Congress 455
Pineapple Juice..... 455
The Late Infectivity of Scarlet Fever..... 456
Alum in Baking Powders.. 456
The Medical Relations of Lafontaine 457
A New Anthelmintic..... 457
The Late Sequelæ of Epidemic Encephalitis 457
Local Malaria Control in Bengal 458
Chemists and Benzol..... 458
The Physiology of Fasting 458
Amyloid Disease 459
Strontium for Migraine.... 459
Current Vital Statistics .. 459

BRITISH MEDICAL ASSOCIATION.
Section of Medical Sociology: The Falling Birthrate 463
Section of Preventive Medicine: Control of Infectious Disease 465
Section of Public Health: The Teaching of Hygiene 466
Section of Therapeutics: Gastric Diseases..... 468

NEW INVENTIONS.
A New Syringe for Injecting Sclerosing Solutions into Varicose Veins. By A. A. MILLER—(*Illustrated*) 452
Needle for the Injection Treatment of Varicose Veins. By H. ARTHUR MURRAY, M.B.—(*Illustrated*) 452

CLINICAL INTERPRETATION OF AIDS TO DIAGNOSIS.
I. The Widal or Agglutination Reaction in the Diagnosis of Infections due to Enteric Group of Micro-organisms. By A. B. ROSHER, M.R.C.S., D.P.H.—(*Illustrated*) .. 461

SPECIAL ARTICLES.
Vital Statistics of England and Wales: The Registrar-General's Review of 1926—(*Illustrated*) 469
Notes from India: The Incidence of Leprosy .. 472
United States of America: The Medical Civil Service 473
The German Sickness Insurance System 474
Medicine and the Law: Dangerous Drugs Legislation 475
Tuberculosis in Ireland .. 476
Infectious Disease in England and Wales 469

THE SERVICES.
Royal Naval Medical Service (Dental Branch).—Honorary Appointments to the King.—Restricted Leave owing to Smallpox.—Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force.—Indian Medical Service..... 460

CORRESPONDENCE.
Smooth and Rough Variants of Bacteria (Dr. Sheldon F. Dudley) 476
Papworth Colony and Sanatorium Treatment (Dr. F. R. Walters) 477
The Later Results of Partial Gastrectomy for Gastric and Duodenal Ulcer (Dr. Arthur F. Hurst, and Mr. E. R. Flint) 477
The Heart and Circulation in Beri-beri (Dr. G. Arbour Stephens) 478
The Vitamin A Content of Cod-liver Oils (Prof. E. Poulsson) 478
Instruction in Psychiatry (Dr. Hubert J. Norman) 479
"Fussing Over Cancer" (Dr. G. B. Hillman) 479
Osteoclastoma (Prof. M. J. Stewart) 480

OBITUARY.
William Smith Syme, M.D.—(*With Portrait*) 480
Mary Lauchline McNeill, M.B. 481

MEDICAL NEWS.
Society of Apothecaries .. 481
The Rating of Hospitals .. 444
New Hospitals for Egypt.. 444
Royal National Orthopædic Hospital 447
Florence Nightingale Fund 447
A Tunbridge Wells Centenary 449
Post-vaccinal Encephalitis 455
Guy's Hospital 460
Marie Céleste Samaritan Society 463
Treasurer of Radcliffe Infirmary 463
A Revolving Open-Air House 469
The Retirement of Dr. E. C. Thompson 472
Payment for Motor Accident Patients..... 480
Royal Medical Benevolent Fund 481
Dermatitis among Bakers 481
The London Hospital 481
Manchester Guardians and Cancer Fund 481
Maternity Hospital for Southport 482
The late Dr. S. W. Griffith 482
Royal Westminster Ophthalmic Hospital 482

NOTES, COMMENTS, AND ABSTRACTS.
Hospital Law: Liability of Hospitals and their Professional Staffs for Torts. By Captain J. E. STONE, F.S.A.A. 483
"The Well of Loneliness" 484
Jungle and Malaria 484
Report of the Imperial Social Hygiene Congress 484
New Preparations: Atophan Balsam.—Zymocide.—Robinson's "Patent" Barley in Powder 484
The Buckston-Browne Prize 484
A Brochure on Tea 484

Medical Diary 482
Appointments 482
Vacancies 482
Births, Marriages, Deaths 482

THE LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY LIMITED.

(FOUNDED 1892)

Registered Office: VICTORY HOUSE, LEICESTER SQUARE, W.C.2.

Telegrams: "MEDICAVERO, WESTRAND, LONDON." *Telephone:* REGENT 0611.

President: Sir JOHN ROSE BRADFORD, K.C.M.G., C.B., C.B.E., M.D., F.R.C.P., F.R.S.
Treasurer and Chairman of Council: C. M. FEGEN, M.R.C.S., L.R.C.P., D.P.H.
Trustees for the Reserve Fund:
Rt. Hon. LORD DAWSON, G.C.V.O., K.C.B., M.D., F.R.C.P. Sir ANTHONY A. BOWLBY, Bart., K.C.B., K.C.M.G., K.C.V.O., F.R.C.S. Sir HARRY BALDWIN, C.V.O., M.R.C.S., L.D.S.

The Society was founded for the following purposes: To protect, support, and safeguard the character and interests of legally qualified Medical and Dental Practitioners; to advise and assist Members of the Society in matters affecting their professional character and interests; and to indemnify them in regard to actions, etc., undertaken on their behalf.

SUBSCRIPTIONS. There is an Entrance Fee of 10s., and an Annual Subscription of £1.

The Invested Funds of the Society exceed £38,100. The Society is fully insured to an unlimited extent against all adverse costs and damages which may be awarded against Members in any action which the Society undertakes on their behalf.

Forms of application for Membership and full particulars may be obtained from the Secretaries at the above address.

OXFORD MEDICAL PUBLICATIONS

GYNÆCOLOGY WITH OBSTETRICS

By JOHN S. FAIRBAIRN, M.A., B.M. (Oxon.), F.R.C.P. (Lond.), F.R.C.S. (Eng.)

New (2nd) Edition. Pp. 810. 167 Illustrations. 25s. net.

Telephone: CITY 8960. Extension, Dept. R.
Telegrams: OXUNIPRES, CENT. LONDON

THE ROBERT JONES BIRTHDAY VOLUME

A COLLECTION OF SURGICAL ESSAYS.

With a Preface by Sir BERKELEY MOYNIHAN, Bart., K.C.M.G., C.B.

Pp. 446. 355 Illustrations. 42s. net.

GASTRO-INTESTINAL DISEASES

Lectures delivered at the James Mackenzie Institute for Clinical Research, St. Andrews, Winter Session 1927.

Edited by Professor DAVID WATERSTON, M.A., M.D., F.R.C.S. (Edin.)

Pp. 278. Illustrated. 10s. 6d. net

EARLY DIAGNOSIS OF THE ACUTE ABDOMEN.
By ZACHARY COPE, B.A., M.D., M.S. (Lond.), F.R.C.S. (Eng.).
New (5th) Edition. Pp. 260. 30 Illustrations. 10s. 6d. net.

THE TREATMENT OF THE ACUTE ABDOMEN (Operative and Post-Operative).
By the same author
2nd Edition. Pp. 254. 146 Illustrations. 10s. 6d. net

CLINICAL RESEARCHES IN ACUTE ABDOMINAL DISEASE.
By the same author.
2nd Edition. Pp. 237. 44 Illustrations. 10s. 6d. net.

SELF-CARE FOR THE DIABETIC.
By J. J. CONYBEARE, M.C., M.D.(Oxon.), F.R.C.P.(Lond.).
New (2nd) Edition. Pp. 70 3s. 6d. net.

THE PRACTICE OF UROLOGY AND SYPHILOLOGY.
By CHARLES H. CHETWOOD, M.D., LL.D., F.A.C.S.
New (4th) Edition. Pp. 892. 314 Illustrations. 42s. net.

ARTIFICIAL SUNLIGHT AND ITS THERAPEUTIC USES.
By F. HOWARD HUMPHRIS, M.D., F.R.C.P., D.M.R.E.
New (4th) Edition. Pp. 320. 28 Illustrations. 10s. 6d. net.

THERAPEUTIC MALARIA.
By G. de M. RUDOLF, M.R.C.S., L.R.C.P., D.P.H., D.P.M.
Pp. 234. 55 Illustrations. 2 Coloured Plates. 12s. 6d. net.

A HANDBOOK OF DISEASES OF THE STOMACH.
By STANLEY WYARD, M.D., B.S., M.R.C.P.
Pp. 400. 32 Illustrations. 16s. net.

ABDOMINAL SURGERY OF CHILDREN.
By L. E. BARRINGTON-WARD, Ch.M., F.R.C.S.(Edin. and Eng.).
Pp. 300. 82 Illustrations. 3 coloured plates. 15s. net.

New Catalogue Free *Upon Application.*

The Oxford University Press

HUMPHREY MILFORD. Dept. R., Falcon Square, London, E.C.1

(And of all Booksellers).

Ingleby Lectures

ON

SOME RECENT ADVANCES IN OUR KNOWLEDGE OF

RICKETS AND ALLIED DISEASES.

Delivered at the University of Birmingham

BY LEONARD G. PARSONS, M.D., F.R.C.P. LOND.,

PHYSICIAN TO THE CHILDREN'S AND GENERAL HOSPITALS, BIRMINGHAM.

LECTURE I.*

THE renaissance of medicine, or perhaps it were better to say the birth of physiology, occurred exactly 300 years ago, when the immortal William Harvey published his treatise "Exercitatio Anatomica de Motu Cordis et Sanguinis." It is interesting to speculate on the connexion between this event and the recognition of the disease which forms the subject upon which I have chosen to speak. There is no doubt that Harvey's discovery profoundly impressed the scientific world of his time; indeed, his work was universally accepted, and "inculcated as a canon in most of the medical schools in Europe" during his lifetime. I think that there can be no question that this discovery stimulated many of the doctors of his day to closer observation and led to the recognition of rickets. Although it seems certain that rickets existed at least 200 years before Harvey's day, yet it only appears for the first time in the list of diseases in the London yearly bills of mortality in the year 1634. During the early seventeenth century these bills seem only to have been printed in years of extraordinary mortality. The earliest known copies belong to the year 1625, and there are bills extant for 1629, 1630, 1631, 1632, 1633, 1634, &c., but it is only in the year 1634 that rickets occurs as one of the causes of death. It is probable, however, that Harvey's work had an even more important influence on the knowledge of rickets, since in the year "De Motu Cordis" was published, Francis Glisson was lecturer in Greek, and in the following year Dean of Gonville and Caius College, Harvey's own College. It surely must be something more than a mere coincidence that he should then turn his attention to medicine, proceeding to the degree of doctor of medicine in the year 1634. Glisson later became one of the members of a small society which met weekly in London for the purpose of promoting inquiries into natural and experimental philosophy, and which after the Reformation developed into the Royal Society. Seven members of this Society, all Fellows of the Royal College of Physicians, "communicated to each other observations concerning this new disease. From these it was thought proper to make extracts and compose an express treatise on the subject, the care of which was unanimously delegated to Drs. Glisson, Bates, and Regemorter. The plan at first agreed on was that each should take a separate part of the work and complete it. But on Dr. Glisson finishing his, which contained an investigation of the cause of the disease, to the satisfaction of the other two, but with many opinions peculiar to himself, they changed their design and committed to him the planning of the whole work that all its parts might be congruous and dependent on each other." This book, which it will be remembered bore the title "De Rachitide seu Morbo Puerili qui vulgo the Rickets dicitur," was a masterly treatise on what he considered to be an entirely new disease which had arisen some 30 years previously in Somersetshire and in his native county of Dorset. The impression created by this work was shown by the fact that rickets has ever since been known in Germany as the English disease.

Although Glisson attributed rickets to disturbed nutrition by arterial blood and believed that the bone changes were due to excessive vascularity, yet it is true to say that according to his conception rickets was a disease of the bony skeleton. He suggested the title rachitis for two reasons, partly because of its likeness to the word "rickets"—the name applied to the disease by the common people—and the other because the vertebral column was so frequently affected in this disease, ραχις being the Greek word for spine. Rickets, on the other hand, is probably derived from the Anglo-Saxon word wrickken (to twist), and was applied to the disease because of the deformities which characterised severe cases. This word has passed into common usage in our language; thus we speak of a rickety chair or table, a phrase which calls up in our minds the picture of a piece of furniture which can well be compared with that of a child suffering from severe rickets whose twisted limbs are ill-adapted to support its weight. Although it is true that the characteristic changes are to be found in the skeletal system, and particularly in that part of the skeleton which is growing rapidly, the view that rickets is a disease of bone is quite wrong. This idea, however, dominated the study of rickets for over 250 years, and it is only fitting that, as the birth of our knowledge of rickets can be claimed for an Englishman, its renaissance and the origin of the present conception of rickets should be shared equally by a Scotsman, Leonard Findlay, and an Englishman, Gowland Hopkins. The modern view of rickets, evolved during the last 15 to 20 years, is that the disease is a general nutritional or metabolic disorder which affects every system of the body, the early symptoms bearing no direct reference to the skeleton. Thus, rickets may show itself as a respiratory disorder in recurring attacks of bronchitis; as a gastro-intestinal affection in recurring diarrhœa; as a nervous disorder in tetany, convulsions, &c.; as a muscular disease in severe hypotonia; but eventually characteristic bone changes always occur. The development and proof of this theory has been in a large degree the work of numerous British and American investigators, and furnishes a most striking example of the interdependence of laboratory research and clinical medicine.

In order to understand how recent researches have added to our knowledge of the very complex problems of the ætiology and cure of rickets, it is necessary to have some knowledge of the radiographic appearances, the chemical processes involved in the deposition of bone, and the histological characters of normal and rachitic bone.

HISTOLOGY.

A longitudinal section of a long bone of an infant shows a clean cut end (epiphyseal line) to the shaft (diaphysis), and a disc of whitish cartilage (epiphyseal cartilage) between this and the bony epiphysis in those instances in which ossification of the epiphysis has occurred. In a rachitic bone quite a different picture is obtained. The width of the epiphyseal disc of cartilage is considerably increased. There is no epiphyseal line, but its place is taken by an irregular frayed end to the diaphysis. This frayed end, which is more vascular than normal, is usually scooped out and expanded laterally, the result of pressure, thus producing the clinical sign of enlargement of the epiphysis. To this altered extremity of the diaphysis the term metaphysis is applied.

Microscopical examination of the growing end of a normal bone reveals in passing from the epiphyseal cartilage to the diaphysis, first, ordinary hyaline cartilage followed by the zone of cartilage proliferation in which the cartilage cells become increased in number and then arranged in columns of 6 to 15 cells. The cells eventually become larger, and the number in each space increased. The cell columns are separated from each other by columns of hyaline matrix. This area is followed by the zone of provisional calcification in which lime salts are

* Lecture II. will appear in a coming issue of THE LANCET.

deposited in the columns of matrix. As a result the columns become rigid and thus direct the budding capillaries from the marrow up against the cartilage cells, which are either destroyed by erosion or become lost in the medullary spaces. The columns themselves are then partly destroyed and partly act as centres round which osteoblasts arrange themselves and form bone which at first contains no calcium and is known as osteoid. In health this osteoid layer is only a narrow area in which calcium is soon deposited and true bone formed.

In rickets this orderly arrangement is completely lost. The zone of cartilage proliferation is increased vertically and laterally, the columnar arrangement being at first manifest, but the cells in the column are more numerous and soon this design is lost and the cells appear as masses in a hyaline matrix. The zone of provisional calcification is absent, with the result that the marrow vessels grow in all directions. The osteoid layer is greatly thickened and forms the rachitic metaphysis; in it are islands of cartilage cells, wide spaces containing marrow, and in its deeper parts irregular depositions of calcium forming true bone and producing the characteristic dentate frayed appearance of the end of the metaphysis.

When healing takes place, the first thing to occur is the deposit of calcium in the cartilage where the zone of provisional calcification should have been. This at first is a thin irregular line, but as healing advances it thickens, depositions of calcium occur in the osteoid tissue, and the cartilage in the metaphysis gradually disappears. Osteoid tissue is also present under the periosteum in larger amounts than normally, producing irregular masses, buttressing, and the elimination of the sharp angles, borders and prominences of the long bones, and giving rise in the membrane bones of the skull to bossing.

The typical microscopical findings in rickets are: (1) the presence of large amounts of osteoid tissue; and (2) the substitution of disorder for order.

Radiographic Manifestations.

These are best studied in the lower end of the radius. Except in very slight cases the bone trabeculæ are more coarse and blurred than normal. This coarsening increases as the disease advances and becomes very marked in severe cases. The appearance of the metaphysis varies with the degree of activity of the child, and, therefore, with the severity of the disease. In those children who are not too ill to be fairly active the end of the diaphysis is scooped out and expanded laterally, the so-called "champagne-glass" appearance. The distance between the epiphysis and the diaphysis is increased, and in place of the sharp epiphyseal line there is an irregular frayed margin. The frayed-out ends of bone gradually fade away towards the epiphyseal disc of cartilage until no bone shadow is seen. This is the characteristic appearance of the rachitic metaphysis in what has been called by Wimberger the active form of florid rickets. The appearance, however, is not seen in all the long bones even in this active form; for instance, it is never seen at the lower end of the humerus. If the disease is so severe that the child is unable to crawl or walk, the passive type of florid rickets is found. In this variety the distance between the epiphysis and diaphysis is still greater, but the transition from bone to cartilage is much more abrupt than in the active form of florid rickets. Although the end of the diaphysis is not sharply defined, yet the irregular fraying is not marked, neither is there any scooping out, nor lateral expansion of the diaphysis.

When healing commences a line of shadow appears at a short distance from the end of the metaphysis. This line is due to the formation of a zone of provisional calcification, and represents the epiphyseal line in a normal bone; its distance from the diaphysis depends upon the width of the rachitic zone of the osteoid tissue, and varies directly with the duration of the disease. As improvement continues the space between this line and the diaphysis is gradually filled in by bone in the form of striæ; the shadow of the whole bone increases in intensity; and the epiphyseal line become more dense and regular, until eventually the end of the bone shows a normal appearance. The epiphyseal line may remain slightly wavy for some time and the thickened striæ in the diaphysis behind the metaphysis can be distinguished for many months after healing is complete. In some cases of the passive type the first sign of healing is shown by the development of shadows at the margins of the metaphysis, suggesting the development of a mild degree of the cupping which is so characteristic of the active type. As the bone heals the subperiosteal osteoid tissue also ossifies and becomes evident in the radiogram along the shafts of the long bones, particularly the radius, ulna, fibula, and humerus.

Mechanism of the Deposition of Calcium Phosphate as Bone.

This is a somewhat complicated problem, but viewed in its simplest terms we may, with Howland, regard the serum and circulatory fluids as normally saturated or supersaturated solutions, in which the calcium phosphate of bone is in equilibrium with the dissolved salt and this in turn with calcium and phosphate ions. This relationship can be expressed thus:—

$$[Ca^{++}]^3 + [PO_4^{\equiv}]^2 \rightleftarrows Ca_3(PO_4)_2 \rightleftarrows Ca_3(PO_4)_2$$

Ionised. In solution unionised. Solid in bone.

An increase in calcium or phosphate ions will cause the reaction to proceed to the right and result in the deposit of bone, whereas a decrease in concentration would result in some of the solid calcium phosphate in bone going into solution, the reaction proceeding to the left. According to mass action law, at equilibrium the product of the concentration on one side of the equation divided by the product of concentration on the other side is constant at constant temperatures, and therefore:—

$$[Ca^{++}]^3 \times [PO_4^{\equiv}]^2 = K[Ca_3(PO_4)_2]$$

Now tertiary calcium phosphate is a sparingly soluble salt and in such—

$$[Ca^{++}]^3 \times [PO_4^{\equiv}]^2 = K.$$

This K is called the solubility product constant and whenever the product of the concentration of calcium and phosphate ions becomes greater than the solubility product, solid calcium phosphate will be deposited.

The problem is, however, not quite so simple as this, and at least one other factor must be taken into account—i.e., the presence in the serum of carbon dioxide in considerable concentrations. This has an influence on tertiary calcium phosphate which may be expressed thus:—

$$Ca_3(PO_4)_2 + 2\,H_2CO_3 \rightleftarrows 2\,CaHPO_4 + Ca(HCO_3)_2 \rightleftarrows [Ca^{++}]^3 + [HPO_4^{=}]^2 + [Ca^{++}] + [HCO_3^{-}]^2$$

If the carbon dioxide tension of this solution be reduced, the reaction will proceed to the left and calcium phosphate will be deposited if the solubility product is exceeded, as it will be, since the solution is saturated. Now when the plasma substances, dicalcium phosphate and calcium bicarbonate, arrive at the osteoid and diffuse into the interstitial spaces, the concentration of carbonic acid falls below the plasma level and therefore precipitation occurs.

In rickets the bicarbonate factor is unaltered from the normal, but calcium and/or phosphorus may be. An index of the reduction in the plasma of the material required for calcification could be obtained if it were possible directly to measure calcium and phosphorus ions. Unfortunately, there is no generally accepted method of doing this, but Howland

suggested that the product obtained by multiplying total calcium by total phosphorus would serve as an equally reliable index, and formulated the following rule. The product of the concentration of phosphorus and calcium in the serum, expressed as milligrammes per cent., in the normal child is between 50 and 60; when the product is below 30 rickets is usually present. When it is above 40 either demonstrable healing is taking place or there has never been any rickets. With products between 30 and 40 rickets is usually present.

Robison does not agree with the view that the deposition of calcium phosphate as bone is purely a physico-chemical process, but maintains that the osteoblasts and the hypertrophic cartilage cells of the young animal secrete a very active phosphatase which, by hydrolysing the hexose phosphoric esters of the blood, brings about a local increase in the phosphate-ion concentration, with the result that the solubility product of tertiary calcium phosphate is exceeded and the solid salt is deposited. Together with Maitland, he has proved the complete absence of this esterase from cartilage in the early stage of bone development before the beginning of ossification. The beginning of ossification in the embryo is one of the stumbling-blocks in Howland's theory, for whilst a saturated solution might deposit calcium phosphate on coming into contact with solid bone, in embryonic cartilage there is no such bone. Howland's theory is the more commonly accepted, and his rule is in the main borne out by clinical observations; but it breaks down in renal rickets, and in my opinion the calcium phosphorus ratio is of even greater importance than the calcium phosphorus product.

Both Howland and Robison hold that rachitic bone is just as able to deposit bone as is the normal bone—i.e., the fault does not lie in the bone but in the fluids that bathe it. Robison states that the phosphatase can be demonstrated both in rachitic and normal bone, and Howland bases his argument on some experiments carried out by Shipley, Kramer, and himself, some of which it was my privilege to see. Slices of rachitic bone were placed in blood serum obtained from a normal child, or in aqueous solutions containing calcium and inorganic phosphate in which the concentrations of phosphorus and calcium approximated to those of normal blood serum. These were then incubated at 37° C. and after a time typical calcification occurred. Such calcification, however, did not occur when the slices were placed in serum from a rachitic child or in aqueous solutions if the concentration of calcium and phosphorus were inadequate. Hence rachitic bone tissue is just as able to deposit calcium phosphate as is normal bone tissue, and it remains uncalcified only so long as calcium and phosphorus are supplied to it in such low ionic concentrations that precipitation of tertiary calcium phosphate cannot take place. Rickets, therefore, is not a bone disease, and the deformities are due to stresses and strains upon a soft bone and are really mechanical and not pathological changes.

In the normal infant or young child 100 c.cm. of blood serum contains 10–11 mg. of calcium and 5–6 mg. of inorganic phosphorus, whereas in rickets there is considerable diminution in phosphorus, which may even be as low as 1 mg. per cent. A low serum calcium is rarely found with uncomplicated rickets, but does occur in tetany, in cœliac, and, sometimes, in renal rickets. In rats, on the other hand, it is possible to produce rickets associated with either low calcium and normal phosphorus (low calcium rickets), or normal calcium and low phosphorus values (low phosphorus rickets) by feeding respectively with a diet that is defective in calcium or in phosphorus. A low concentration of either of these two elements in the serum can thus occur if the dietary is insufficient, but may also occur even when the dietetic supply is normal if absorption from the bowel is impaired. If my view is correct, that the ratio of calcium to phosphorus is more important than the actual concentration, it is possible for rickets to occur even if the absorption of both elements is normal, if there is some impairment of excretion. Calcium is chiefly excreted into the large intestine and also to a small degree in the urine. There does not appear to be any primary defect in urinary or intestinal calcium excretion which ensures abnormal calcium retention; indeed, hypercalcæmia induced experimentally soon leads to death. Phosphorus, on the other hand, is excreted chiefly by the kidneys, and here we have a very different state of affairs, since in chronic intestinal nephritis there is phosphorus retention, the calcium phosphorus ratio is altered, and we have a condition which should produce a low calcium rickets, and this in fact occurs (renal rickets).

The modern conception, as I understand it, is, therefore, that rickets is a disorder of calcium and phosphate metabolism resulting from defective absorption (and retention) of these elements from the intestine and rarely from defective excretion of phosphate. As a corollary we can say that rickets can be prevented or cured by taking measures to ensure the normal absorption of calcium and phosphorus from the bowel, and their normal retention in the body.

The questions which recent research has endeavoured to answer are: 1. What are the factors influencing calcium and phosphorus absorption from the bowel? 2. What are the ætiological factors concerned in the production of rickets and how can rickets be cured? These two questions are really interdependent, or are even two ways of asking the same question, but it will be convenient to consider them both and to consider the second before the first.

ÆTIOLOGICAL FACTORS.

Rickets has no single specific constant ætiological factor, but may arise from defective hygienic surroundings, particularly lack of sunshine, or from dietetic causes. There have thus developed two schools of thought—by the one rickets is regarded as a primary dietetic disease, and by the other as due to defective hygiene. The controversy between the protagonists of these theories has been severe, at times even acrimonious, although the results of recent investigation have tended considerably to the restoration of harmonious relations.

The importance of defective hygiene has been emphasised by the Glasgow School as the result of an extensive series of investigations. The hygienic conditions of children suffering from rickets were contrasted with those of normal children in the same social scale and it was shown that the rachitic children were obviously defective in fresh air and exercise, diet being apparently of secondary importance. Two of the Glasgow workers, Hutchison and Shah, investigated the occurrence of rickets in India, and found that, while low caste children did not develop rickets, the disease was common amongst high caste children who lived under the "purdah" system. Late rickets was also common amongst "purdah" women in spite of the fact that their diet and that of their children contained far more fat than did that of the low caste women.

The fact that rickets is a disease of temperate zones and very rarely occurs at high altitudes or in tropical countries, except under the conditions just described, has been known for years. But that this immunity was due to sunlight, and that sunlight could prevent and cure rickets, has only been generally recognised recently, although as long ago as 1890 Palm drew attention to the importance of sunlight in this connexion. The value of sunlight was, however, not appreciated until Huldschinsky, in 1919, showed that rickets could be cured by the action of ultra-violet rays, and Hess and Unger, in 1921, conclusively demonstrated the cure of rickets by sunlight. Although Findlay regarded lack of exercise as being the essential factor of defective hygiene, the balance of evidence points very strongly to the conclusion that the results of defective hygiene are in reality due to lack of sunshine.

Since the original statement of Kassovitz in 1884 many observers have commented upon the seasonal

incidence of rickets. The greatest incidence of the disease is in the late winter and early spring months—e.g., January to May—but the seasonal variations are much more marked in countries with a considerable amount of sunshine, such as Canada, the United States of America, and Austria, than in countries like the British Isles in which, indeed, the seasonal variations are not very obvious. It is interesting to note that coincident with the seasonal incidence of rickets there is a seasonal decrease in the calcium and phosphorus of the blood. Recent observations by Brown and Tisdall, in Toronto, have shown that there is a sharp rise in the antirachitic effect of sunshine about the beginning of March, and that the antirachitic effect of April and May sunshine is about eight times that of December, January, and February. The same investigators also found that a considerable amount of ultra-violet irradiation takes place as a result of reflected rays from the sky and clouds, the antirachitic effect of which is approximately one-half to two-thirds of that produced by what is ordinarily termed sunshine—namely, direct rays from the sun plus reflected rays from the sky. All ultra-violet rays are not of value in preventing or curing rickets. In sunshine the most effective rays are the shortest, the wave-length of which ranges from 2900 to 3130 Angstrom units. Unfortunately, in those industrial areas of the British Isles where rickets is prevalent sunshine is somewhat rare, and any that may occur is almost valueless either for prevention or cure, since the smoke pall cuts off the ultra-violet rays. Moisture of the atmosphere, such a constant feature of our climate, also cuts off many of the rays. When the atmosphere is heavy with moisture, or polluted with smoke or dust, waves shorter than 3000, or even 3100, Angstrom units may be absorbed (Hess and Anderson.)

Ordinary flint window glass completely cuts off all the curative ultra-violet rays, and, therefore, several substitutes for window glazing have been invented. The one best known in this country is Vita glass, which transmits rays down to 2900 Angstrom units. Tests on rachitic babies carried out in Boston, U.S.A., by exposing them to winter sunshine near windows, showed that Corning glass and quartz glass transmitted enough ultra-violet rays to cure rickets in very black babies, but whilst Vita glass transmitted light waves to the extreme limits of the sun rays, it did not transmit them in sufficient quantities to be of use in healing black babies during the winter months, but the observers thought that better results could be obtained if longer exposures to the sun rays were given. There are two differences between Boston and this country. In the first place, it is a city with very much less smoke than our industrial cities; and, secondly, the question of black pigmented babies is one of little importance here. Vita glass is unquestionably of value in country districts, but in my opinion it is practically useless in smoky cities.

Antirachitic powers can be conferred on certain foodstuffs by exposing them to the action of ultra-violet rays. Thus milk in both liquid and dried forms, wheat, and vegetables, such as spinach, carrots, &c., have been rendered antirachitic. On further investigation this property was found to be due to the activation of certain sterols, cholesterol in the animal, phytosterol in the vegetable compounds, and the administration of irradiated cholesterol and phytosterol was found to protect rats from rickets. Active cholesterol was also found to give a characteristic absorption spectrum in the ultra-violet region. The effect of administering irradiated cholesterol to children suffering from rickets was subsequently tried at the Children's Hospital, Birmingham, and we had the privilege of demonstrating the complete and rapid cure of a case of severe and resistant rickets. The details may be of some interest because the clinical experiment was controlled as carefully as possible.

The patient, aged 3 years, had received treatment by cod-liver oil from April to September, 1925—i.e., during the spring and summer months. He was admitted into hospital in September and for one month did not receive any antirachitic treatment, but was placed on the full hospital dietary. Radiograms taken 14 days after admission showed a slight degree of healing when compared with that taken on admission, possibly due to the effect of the cod-liver oil taken before admission, but no further healing of any moment occurred between the fourteenth and twenty-eighth days.

The child was then given 1 drachm three times a day of a 3 per cent. solution of irradiated cholesterol in linseed oil for a few days, and then the dose was increased to 2 drachms three times a day. In three weeks considerable healing had occurred, and complete healing was noted in 11 weeks.

The points to notice are: (1) that the case was one of a group of rickets which is somewhat resistant to cod-liver oil therapy; (2) that a period was allowed before starting cholesterol treatment, so that the effect of any delayed healing from cod-liver oil was eliminated; (3) that cure was produced in the autumn and winter months.

Later we used irradiated cholesterol in powder form in the treatment of cœliac disease, with and without rickets, with most encouraging results. The cholesterol used was chemically pure cholesterol and was irradiated by the method suggested by Hess.

The antirachitic power of irradiated cholesterol diminishes after a time; also, unless certain precautions are taken, such as the removal of the ozone generated, prolonged irradiation renders cholesterol inactive again. We also found that some of the batches of irradiated cholesterol did not appear to be as potent as others. As a result of certain experiments, Heilbron, Kam, and Morton came to the conclusion that not cholesterol itself, but some substance associated with it is activated by irradiation, and Rosenheim and Webster found that chemically pure cholesterol, prepared by formation of its dibromo derivative and the reduction of this to cholesterol again, developed no antirachitic power after irradiation. These workers showed that only cholesterol obtained from natural sources—i.e., bile, brain, &c.—could be activated, but they came to the conclusion that the impurity itself must be a sterol since it formed an insoluble compound with digitonin. It was suggested by Windhaus that this sterol might be ergosterol, obtainable from ergot, yeast, &c., because it was the only known sterol having a structure likely to give it the required properties. Ergosterol was therefore investigated by them and also by Hess, and was found to develop intense antirachitic powers on irradiation, being about 2000 times as strong as ordinary cholesterol, and it, or a sterol closely similar to it, is now regarded as the impurity which is activated when natural cholesterol is irradiated. Ergosterol when irradiated is the most powerful antirachitic substance known; 1/10,000 mg. will protect rats from rickets, and it is estimated that 5 mg. are equivalent to 1 litre of the best cod-liver oil known. Irradiation leads to an obvious physical change in ergosterol, a yellowish resin being produced. How much of the substance is actually activated is not known, and it is possible that further experiments may yield more intensely antirachitic substances.

Diet and Vitamins.

In the clinical study of rickets two facts stand out. First, that the condition often develops in children who are fed on a diet rich in carbohydrates but poor in fat, such as condensed sweetened skimmed milk and many proprietary foods. Secondly, that in most instances it can be cured by the exhibition of cod-liver oil.

In 1918 Mellanby suggested that rickets might be due to the absence of an accessory food factor, and later stated that this antirachitic factor was probably identical with vitamin A. In his view cod-liver oil had the strongest, and vegetable oils scarcely any antirachitic action. Milk and yolk of egg contained a large amount of antirachitic substance. Mellanby's experiments and conclusions were, however, criticised adversely by many people. During the war Denmark exported large quantities of butter to Germany, with the result that poor people were unable to buy whole

milk. Skim milk, however, was easily procurable and was largely used for the feeding of infants. As a result many of these children developed nutritional disorders (dystrophia alipogenetica) often associated with xerophthalmia, which, in many instances, passed on to total blindness. The proof that this condition was due to lack of fat was forthcoming when the Danish Government took over the supplies of butter, rationed it, and allowed 250 g. weekly to each individual, with the result that xerophthalmia immediately ceased. Bloch, who described these cases, emphasised the fact that in spite of the absence of fat these children rarely developed rickets, and he concluded that absence of vitamin A caused xerophthalmia but did not produce rickets. By feeding rats on a diet deficient, amongst other things, in fat, rickets and xerophthalmia can be produced experimentally.

In 1920 Gowland Hopkins showed that it was possible to destroy vitamin A in butter and cod-liver oil by heat and aeration, and in 1922 McCollum and his co-workers found that cod-liver oil so treated would no longer cure experimental xerophthalmia but would cure rickets. It appears clear, then, that closely associated with vitamin A is another fat-soluble vitamin which has antirachitic properties, and this is called vitamin D. Cod-liver oil is a good source of both vitamins, but cow's milk, whilst rich in vitamin A, is a poor source of vitamin D. The fact that some fats contain considerable amounts of vitamin A and but little vitamin D is the probable explanation of the failure of some workers to confirm Mellanby's experiments.

It is probable that the curative action of sunlight and artificial ultra-violet irradiation in rickets is due to the synthesis of vitamin D by the activation of ergosterol, or some similar sterol, found in association with cholesterol in the skin. Indeed, irradiated ergosterol is so potent that it has been suggested that it is pure vitamin D. Evidence that irradiation does produce vitamin D *in situ* is found in the fact that rats fed on a dietary producing the low phosphorus type of rickets develop an alkalinity of the fæces, the pH of which can be reduced, even to the acid side of neutrality, by irradiation or by the administration of irradiated ergosterol or cod-liver oil. Further evidence that irradiation of the cholesterol (or ergosterol) of the skin has a curative action is found in the observation of Hume, Henderson-Smith, and Lucas that inunction of irradiated cholesterol into the skin of rabbits and rats fed on a rickets-producing dietary prevented the development of rickets.

Whence comes the vitamin D present in cod-liver oil? It has been stated that this is obtained from the green algæ and diatoms (plankton) in the upper waters of the ocean, and that in these vitamin D is synthesised under the influence of sunlight. This plankton constitutes the food of small fish, which in their turn form the diet of the cod, and in the latter the vitamin is largely housed in the liver. The most recent researches, however, show that, whilst the marine diatom is a rich source of vitamin A, it contains no vitamin D, and the suggestion has been made that, both in relation to green plankton and green vegetables, which contain much vitamin A but little or any D, the same mistake has been made as in the earlier work of Mellanby on fats when no differentiation was made between the A and D vitamins. Moreover, Bills has shown that the principal food of the Newfoundland cod is the caplin, but that this does not contain enough vitamin D to account for the amount of vitamin which is accumulated by the cod during its mid-summer period of fattening, and he therefore suggests that the vitamin may be synthesised by the cod.

The exposure of an animal to sunlight raises the content of vitamin D in its milk, and for this reason cow's milk shows a seasonal variation in vitamin D content which is related to similar seasonal variations in the incidence of rickets. The content of vitamin D, however, is not greatly increased by sunlight, but can, on the other hand, be considerably augmented by exposing the animal to ultra-violet rays from artificial sources, although such milk will not compare in antirachitic power with milk irradiated directly. It seems evident, therefore, that during the winter months breast milk must be considerably poorer in vitamin D than in the summer. However, it has been proved, as in the case of cow's milk, that the antirachitic properties of human milk can be increased by the irradiation of the mother, and that if cod-liver oil be given to her, the vitamin D can pass into her milk. Although it is a matter of universal clinical observation that rickets is far less common in children who are breast-fed, the question of the antirachitic effect of human milk and its relationship to vitamin D is one of great interest and difficulty. This difficulty will become even greater if confirmation is obtained of some recent experiments of Hess, from which he concludes that human milk is exceedingly poor in the antirachitic substance, and that its high protective power in rickets cannot be ascribed to that factor. McCollum states that animal experiments make it clear that faulty nutrition of the mother during pregnancy and the early part of the nursing period may so debilitate her young that later a diet which should protect against rickets may fail to do so, and, according to Greenbaum, if the maternal diet during the last three months of pregnancy is made approximately correct in caloric and mineral intake, rickets will not be absolutely prevented, but the mother's diet will have a controlling influence in the development of the disease in the offspring.

Rickets, however, does frequently occur in breast-fed premature children, twins, and particularly in dark-skinned Italian and negro children living in North American cities. Prolongation of breast-feeding into the second year of life is also very liable to produce rickets. The conditions under which Eskimo children live are of great interest in this connexion. In Greenland rickets does not exist, despite the fact that children are nursed until the age of 2 to 4 years, whereas in Labrador, although the children are much more exposed to sunshine, rickets is almost universal. The Greenland Eskimo, contrary to popular belief, eats little fat, but partakes freely of uncooked fish, birds, seals, &c., and the freedom from rickets is probably due to the presence in this diet of considerable quantities of vitamin D derived from the fish on which the birds and seals feed. The Labrador Eskimo, on the other hand, cooks his food, a large proportion of which is prepared or tinned, and eats very little vegetables (Thomas).

Calcium and Phosphorus.

From what has previously been stated, it is obvious that another important factor in the dietary is an ample supply of calcium and phosphorus. Adequate supplies of vitamin D or sunshine will prevent or cure rickets even when a baby is taking a diet which, from deficiency in calcium, phosphorus, or vitamin, would otherwise produce rickets.

Of all the factors concerned in the prevention of rickets, exposure of the body to sunshine and the preservation of the natural habitat of the child and diet of the mother are probably the most important. As clothing increased, and with it the urbanisation of society, the migration into cities and darkened dwellings, or, as in the case of the negro peoples, if movement occurred into more temperate zones, or, as in the case of the Labrador Eskimo, the maternal diet so changed that the supply of vitamin D diminished, rickets developed even in breast-fed children, but with more certainty in those artificially fed. Thus we have the appearance and development of rickets associated with the progress of civilisation, and in particular, with the rise of industrialism and the decline of breast-feeding.

As a result of these recent advances in our knowledge of the ætiology of rickets, the question may well be asked: was Glisson right in his view that rickets was a disease which had made its appearance for the first time but a few years before his monograph was written? It is true that the factors necessary for the production of rickets have been present, at

least in Europe, since ancient times, although there is no reference to rickets in Hippocrates, Galen, or Celsus. Soranus of Ephesus, a physician who practised in Rome during the second century A.D., wrote thus :—

> The infant's feet become deformed from unwise attempts at walking. Frequent examples of such deformities are seen in Rome, due in most cases to ignorance and improper care of the infant. City women devote much less care to their infants than those in rural districts, hence the more frequent occurrence of these deformities among the infants of city dwellers.

Surely Findlay is justified in regarding this as a description of rickets. We have, however, even more positive evidence that rickets existed 200 years before Glisson's time, for in the paintings of the fifteenth century artists of the Netherlands and Germany, especially those dealing with the Nativity, clinical evidence of rickets can be seen. In our own National Gallery there are several pictures of this type, but I will only mention one painted by the Netherlands artist, Dirk Bouts, in the year 1490. This picture shows definite evidence of rickets, not only in the child but also in the mother, whose forehead is an excellent example of Parrot's nodes. Anyone can multiply examples of this kind by exploring the galleries of Amsterdam, The Hague, &c. It is quite clear that in choosing models for such a subject the artist would not wittingly select those showing the stigmata of disease, but rather those approaching his ideal of perfect physical development. It is surely, therefore, a logical conclusion that in the fifteenth and sixteenth centuries, when the privations of war were frequently experienced by dwellers in the Low Countries, rickets was a common condition in the industrial cities of Holland and Germany (Foote).

CARCINOMA OF STOMACH.*

By A. J. WALTON, M.S. Lond., F.R.C.S. Eng.,
SURGEON TO THE LONDON HOSPITAL.

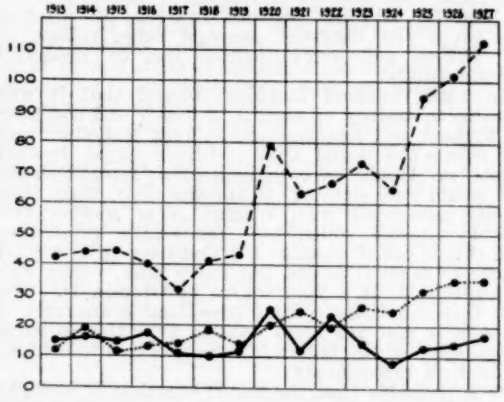
In the public mind there is a belief that cancer is not only uniformly fatal, but that it is rapidly increasing in frequency. Recent careful investigations have shown that this view is too pessimistic, and it has become quite evident that the different varieties of carcinoma vary considerably in their severity, many examples being permanently cured if subjected to early operative intervention. Of these varieties carcinoma of the stomach must, however, be considered one of the most unsatisfactory, for the early diagnosis is associated with much difficulty, and the late prognosis, as shown by more careful follow-up records, is not nearly so good as was at one time believed. It is therefore all the more satisfactory to note that there is little or no evidence that the disease is on the increase. Such a belief is based upon the returns of the Registrar-General, but these are probably of doubtful value, for with improvement in diagnostic methods cases are included that were previously omitted, and it is almost certain that many others are recorded as carcinoma when the diagnosis has not been confirmed by microscopic investigation. My own figures concern patients who have all been subjected to operation, and the diagnosis has therefore been proved either by visual inspection or by microscopical examination, confirmed in all cases by a careful observation of their after-progress. Thus, although small in number, they are of considerable interest. There has been little or no increase in the numbers operated upon year by year, whereas the proportion of cases of carcinoma to those of other lesions of the stomach has shown a very marked decrease. From 1913 to the present date the total number of cases of carcinoma of the stomach that have come to me for operation has been 229, and the total number of simple chronic ulcers 1086, the carcinomata thus forming about 17 per cent. of the total.

* Being a communication made to the International Cancer Conference, recently held in London.

In other words, of every six gastric operations one is performed for carcinoma of the stomach. The numbers of these lesions operated upon each year is shown in Fig. 1. This chart shows clearly that whereas the number of ulcer cases operated upon has multiplied nearly three times the number of carcinomata has remained nearly constant year by year.

Of more importance than the relationship to the total number of ulcers is that to ulcers of the body of the stomach, for it is this variety which is not

FIG. 1.



Frequency of carcinoma and chronic ulceration. Total cases of carcinoma 229 (males 166, females 63); total cases of chronic ulcer 1086 (males 824, females 262).

In both figures the continuous line indicates "carcinoma," the interrupted line "all ulcers," and the dotted line "lesser curve ulcers."

only more likely to become carcinomatous, but is most commonly confused with carcinoma either before or during operation. Duodenal ulcers, on the other hand, may be said never to become carcinomatous, and it is this variety which has shown the greatest increase. Nevertheless, lesser curve ulcers are nearly three times as frequent in my present practice as they were in 1913.

It must be remembered that these figures, occurring as they do in the practice of one surgeon, are no evidence of an increase in the number of chronic ulcers in the general population, but since the ulcers have so greatly increased in number a corresponding increase would be expected in the numbers of carcinomata, and since it has not occurred it would suggest that carcinoma of the stomach is becoming a less frequent disease. The only explanation I can offer is that of recent years our work has been, as we should always wish it to be, preventive, and that many patients have been saved from carcinoma by having their ulcers treated surgically while they are yet benign.

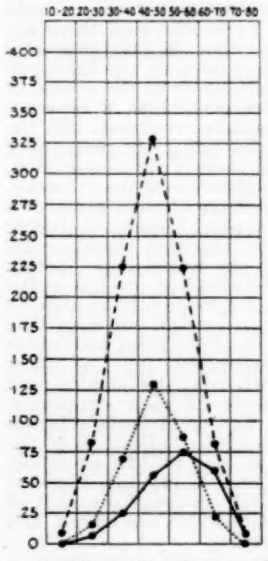
The sex relationship of the two conditions shows that whereas both carcinomata and ulcers are much more common in the male, this frequency is more in evidence in the ulcers than in the carcinomata. Thus, of the 229 cases of carcinomata, 166 occurred in males and 63 in females; whereas of the 1086 ulcers, 824 were males and only 262 were females. There is also a distinct difference in the age-frequency. Carcinomata of the stomach is found most commonly between the ages of 40 and 70, the majority being present between 50 and 60; whereas the ulcers are more frequently detected earlier, being seen most commonly between the ages of 30 and 60, and with the greatest frequency between 40 and 50. In Fig. 2 the frequency of these lesions in the different decades is made apparent.

Results of Operation.

The operative treatment of carcinoma of the stomach has now been sufficiently long in vogue for

us to obtain definite figures of the end-results. It will thus be more valuable to consider whether we are satisfied with these results before discussing how we may more readily make an early diagnosis or improve the technical details of our treatment. When consulting the literature on this subject, there is found to be an extraordinary difference of opinion as to the value of surgical treatment. The early figures of Friedenwald [2] gave a most gloomy prognosis, for he found that of 1000 cases, only nine were capable of having a resection, and not one case was saved thereby. Cheever [1] also found that in a series of 236 cases, radical operation was only possible in 9·7 per cent. Many later figures give a much more hopeful outlook both as regards the possibility of performing a partial gastrectomy and of the ultimate end-results. Mayo [3] has estimated that a correct diagnosis should be made sufficiently early to permit at least 50 per cent. of radical operations, although in his own series the actual number in which a partial gastrectomy was possible was about 35 per cent. He also showed that out of 651 resections of the stomach, 38·6 per cent. were alive three years or more, and 26·5 per cent. were alive five years or more after operation. Paterson [6] also states that 24 per cent. of cases were alive and well three years after operation, and 15 per cent. after five years. Hayem [4] found that of 100 cases, 28 passed the three-year period without recurrence. I have given these observations at some length, for nine years' experience in a carefully controlled follow-up department has steadily strengthened my opinion that these later figures are much too optimistic, an opinion which I am not alone in holding. Gibson,[5] in a most valuable investigation in New York, states that "no sadder report of the disheartening status of cancer surgery has come to our attention." Of 70 cases of carcinoma of the stomach he found only one alive and well after five years, and also one only after three years. I regret to state that this experience is much more in accord with my own. It is true that we are all of us conversant with cases which have lived many years after operation. Hayem,[4] for instance, reports one who lived for 27 years, and Pearce Gould,[7] one who lived for 18 years and then had a recurrence. I also have seen a case operated upon by Mr. Hugh Lett in 1910, when I was his registrar, which was proved by microscopic examination, and who was readmitted in 1927 with an anæmia of the pernicious type which might or might not have been due to a recurrence. Such cases are, however, exceptional. In reviewing my own series the large proportion of inoperable cases is very startling. Of the 229 cases it was only possible to perform a partial gastrectomy in 78, that is, 33 per cent., a proportion probably smaller than is found with any other variety of carcinoma. It is, however, in the progress of these cases subjected to what is hoped to be a radical cure that so much disappointment lies. I have been making for the British Medical Association a careful analysis of the cases operated upon by myself in the years 1920–24 inclusive, and for the purpose of this present investigation I have added those cases operated upon before 1920. All the cases, therefore, have been operated upon for four or more years. They number in all 177, of which 62 were subjected to partial gastrectomy. Of these, three cannot be traced, one is well 15 years, one—the only sarcoma in the series—well 12 years, one well ten years, and one seven years after operation (see table).

FIG. 2.



Age-incidence of carcinoma and chronic ulceration.

Cases operated upon 1913–24	..	..	..	177
Partial gastrectomy	..	..	..	62
Not traced	..	..	..	3
Died of recurrence	..	..	..	55
Alive	..	..	..	4
(15 years, 12 years, 10 years, 7 years = 1 each.)				
Total cases (1913–28)	..	..	..	229
Secondary to ulcer	..	..	..	25
Diagnosed as ulcer before operation	..	..	..	55

The remainder have all died with recurrences, some of which only appeared three or four years after operation, and although it is true that many patients have been given two or three years of happy life in place of the three to six months' misery, which would occur with no operation, yet these results must be regarded as being among the most depressing in surgery. In placing these figures before you, I at once lay myself open to the charge of having performed incomplete operations. It may be said, and it probably will be said, that such poor results could only be obtained by insufficient removal of the stomach or glands. It may only be my conceit that makes me believe that this is not the true explanation, but in many cases a very wide resection indeed has been carried out so that it would best be described as a subtotal gastrectomy, and I am very doubtful if a wider removal could have been effected. Moreover, in nearly all the cases recurrence has later taken place either in the liver or in the deep cœliac glands. Therefore I feel certain that improvement in the late results does not lie in more extensive operations, and also that the figures I have put before you give a more correct picture of the results obtained by surgical treatment than many that have been published.

Improved Diagnosis.

In attempting to better our results, it is at once evident that improvement is to be looked for along two lines. The fact that only one-third of the total number of cases are operable is evidence that correct diagnoses are not being made sufficiently early. A large number of my patients have been under medical treatment for prolonged periods, often in the belief that a simple ulcer was alone present, a point to which I shall have to return later. This is, however, only applicable to a certain number. One of the greatest difficulties with which we have to contend is that in not a few cases the symptoms are at first so slight and ill-defined that the patient either seeks no treatment, or attempts to improve his symptoms by the use of domestic remedies, only seeking skilled advice a few days before operation, at which time the disease is already hopelessly inoperable. It is, indeed, difficult to see how any improvement can be made with this class of case, for it is not feasible to suggest that apparently healthy people should, after the age of 40, have routine examinations which would have to include a test-meal and the use of X ray investigations. Some improvement may, however, be expected in this direction if doctors will remember and if the public can be made to realise that any persistent dyspepsia occurring after the age of 40 in a patient with a clear past history is to be regarded as due to carcinoma until this disease can be definitely eliminated.

Malignant Change in Gastric Ulcer.

It is, however, along the second line that the greatest improvement is to be expected. For many years Sir Berkeley Moynihan and others, including myself, have been laying stress upon the fact that a certain number of cases of gastric ulcer tend to

become carcinomatous, and thus the improvement in the results of operation for carcinoma of the stomach lies in operating upon the ulcer in its still benign period. In the United States of America this relationship is well recognised, but unfortunately in this country there has been a tendency of late to belittle the relationship between the two lesions; probably this has in part been due to the fact that in the past it was claimed that the majority of cases of carcinoma commenced as chronic ulcers, a view which wider experience could not support, and hence there is a tendency for the pendulum to swing in the opposite direction. The denial of such a relationship has, however, gone hand in hand with extravagant claims for the value of medical treatment, and this of necessity, for if chronic ulcers may become carcinomatous it will clearly be inadvisable to subject them to prolonged periods of such treatment. It is also unfortunate that the lay press has widely circulated the view that all chronic ulcers can be cured by medical treatment, for there is now a tendency for patients to postpone operation and to undertake a prolonged course of medical treatment, a procedure which I feel convinced will lead to an increase in the number of cases of carcinomata of the stomach, and will undo much of the preventive treatment for which surgeons have striven so long.

In my own series of cases there has been very definite evidence that a certain number of cases of carcinoma have started as chronic ulcers. I have only placed in this group those that have fulfilled the following requirements:—

1. They must all have had a history of many years' standing in which the earliest symptoms were periodic.
2. They must all at the time of operation have had a relatively high test-meal.
3. The appearances of the lesion at operation must have suggested the presence of a chronic ulcer. In some cases, indeed, the diagnosis of chronic ulcer to the naked eye appeared to be definite.
4. The pathological report must have shown that the carcinoma was almost certainly secondary to an ulcer.

In my own series of 229 cases there were 25 examples which conformed with these requirements, and these, of course, do not include any examples which had progressed so far that a radical operation was not possible, or those which had led to a complete achlorhydria. Hence, this figure probably much underestimates the frequency. They are of special importance, for it is in such cases that a radical cure is most to be expected. My patient, who is alive and well seven years after operation, was only recognised to be a case of carcinoma after the microscopic examination, but a partial gastrectomy was carried out on suspicion owing to a slight alteration in the symptoms. She was therefore treated at the earliest possible stage. Of equal importance with this group are those cases which are definitely but erroneously diagnosed as simple chronic ulcers before operation, for it is these cases especially in which medical treatment is likely to be continued and the opportunities of early operation are lost. I have elsewhere pointed out that since the recent vogue for medical treatment four such cases have come to me when the carcinoma was hopelessly advanced. In my own series there were 55 such cases, a percentage of nearly 25 of the total. These had been definitely diagnosed by physicians of wide experience and repute as simple chronic ulcers, and it was only at operation that the evidence of carcinoma was forthcoming. To my mind, therefore, there can be no question whatever that the hope of greater success in the future lies not only in a wider recognition of the early symptoms of carcinoma, but also in the acceptance of the belief that chronic ulcers in patients between the age of 40 and 60 should be subjected to early operative treatment, and should not be treated medically for a long period of time. It is probably owing to such a course of action that my figures show no increase but rather a definite relative decrease in the frequency of carcinoma of the stomach, and every effort must be made not to lose this advantage.

Early Symptoms and Early Treatment.

In the recognition of the important early symptoms, special stress must be laid upon the fact that after a perfectly clear past history the majority of patients have developed a dyspepsia persisting for two or three weeks. I have always taught, and I am confident that it is correct, that if there is no definite error of diet to account for such a group of symptoms, those patients should be regarded as carcinomatous unless definite evidence can be produced to show that they are suffering from some other lesion. It is perfectly true that occasionally, if such a dictum is accepted, a patient will be operated upon and will be found to be suffering only from a gastritis, possibly of an atonic type due to overwork and worry; a careful investigation will, however, often eliminate such a condition. In the few remaining cases it has been my experience, much as I deprecate the use of an exploratory laparotomy, that such patients are so pleased to find that they are not suffering from a carcinoma that they will only too willingly put up with the drawbacks of an unnecessary laparotomy. I have been honoured by having been asked to operate upon a large number of medical men, and these patients, who are those best able to realise the drawbacks of operation, have been only too willing to face the possibility of an unnecessary laparotomy if in the end they can be assured that no carcinoma is present, and it would seem self-evident that the line of conduct which a medical man would choose for himself is the one which he can best advise his patients to follow. Of the individual symptoms of the different varieties of carcinoma I shall say but little, for these have been described upon so many occasions that they should now be well recognised. To briefly sum them up, they are the constancy and often the mild degree of the pain, which, although increased by the taking of food, does not completely disappear in the course of the day, the steady and progressive loss of appetite, the increased feeling of lassitude, weakness, and the loss of the usual feeling of well-being, the presence of frequent regurgitation rather than of actual vomiting, and the failure of relief to be given to the pain thereby. It is especially the supervention of such symptoms upon a case presenting a typical history of gastric ulcer which would lead us to infer that the ulcer has become carcinomatous, but one would hope that in the future this change will be seen less and less as the long-persistent ulcers are more frequently treated by operation. It is well, also, to point out here that cases are seen where there is severe pain, and where there is vomiting of the obstructive type, or where there is hæmatemesis which may be sudden and severe, and that the presence of such symptoms, which are usually regarded as more definite evidence of a gastric ulcer, are no counter-indication of the presence of carcinoma. It is also well to remember that although a test-meal and X ray investigation are of very great value, a high test-meal does not of necessity eliminate the possibility of carcinoma, and neither does a negative X ray.

Such symptoms occurring in a patient over 40 must always be regarded with the most grave suspicion, and it is by the recognition of their importance that one must hope to obtain better results in the treatment of this most dangerous and depressing variety of carcinoma. Although at present but few cases have been cured by operative treatment, there can be no question but that a small percentage are so cured, and of this benefit every patient must be given the advantage at the earliest opportunity, for all other methods known to us at present, such as the use of radium and deep X ray therapy, are—useful though they may be—no more than palliative procedures. It must also be remembered that whereas cases which are not operated upon have an average expectation of life of only three to six months, those who are treated by partial gastrectomy not infrequently live for three or four years in happiness and comfort. In my own series, 15 cases showed evidence of recurrence only between the

second and third year, five between the third and fourth year, and two after four years. My chief reason for putting these figures before you, however, is to impress upon you my belief that in this, as in other branches of medicine, the greatest progress has been and is still to be made by the use of preventive measures. An understanding of the cause of carcinoma implying, as I believe it does, a knowledge as to why a cell reverts from its unipotential character to a totipotential phase, still seems far from us, and until that time arrives, the greatest hope of preventing carcinoma of the stomach lies in the free surgical removal of all chronic ulcers. If the lay press, altering their present views, will help us with the great weight of their authority to teach the public that the majority of such ulcers should be excised, much will be accomplished in diminishing the frequency of this dread disease.

References.

1. Cheever, D.: The Operative Curability of Carcinoma of the Stomach, Ann. Surg., 1923, lxxviii., 332.
2. Friedenwald, J.: A Clinical Study of 1000 Cases of Cancer of the Stomach, Amer. Jour. Med. Sci., 1914, cxlviii., 660.
3. Gibson, C. L.: Final Results in the Surgery of Malignant Disease, Ann. Surg., 1926, p. 158.
4. Hayem, G.: Bull. de l'Acad. de Méd., 1926.
5. Mayo, W. J.: The Radical Operation for Cancer of the Pyloric End of the Stomach, Surg., Gyn., and Obstet., 1914, xix., 683. Cancer of the Stomach, Ibid., 1918, xxvi., 367. Cancer of the Stomach and its Surgical Treatment, Ann. Surg., 1919, p. 236.
6. Paterson, H. J.: The Early Diagnosis and Treatment of Cancer of the Stomach, Brit. Med. Jour., 1910, ii., 953.
7. Pearce Gould, E.: Recurrence of Carcinoma of the Stomach 18 Years after Partial Gastrectomy, Brit. Jour. Surg., 1927, xv., 325.

SYPHILIS OF THE ŒSOPHAGUS.

WITH A REPORT OF TWO CASES.

By A. LAWRENCE ABEL, M.S. Lond., F.R.C.S. Eng.,

SURGEON TO THE KENSINGTON GENERAL AND LONDON LOCK HOSPITALS; ASSISTANT SURGEON TO THE WOOLWICH WAR MEMORIAL HOSPITAL, ETC.

Syphilis of the œsophagus is only diagnosed in one or two of every 1000 cases presenting themselves with an œsophageal lesion. It occurs, however, in all cases of acute syphilis which remain untreated until the so-called "secondary" stage is established, but only as a part of the general inflammation of all mucous membranes, and usually there is a complete absence of any œsophageal syndrome. It is not until a secondary œsophagitis is present, or a spasmodic or organic stenosis appears, that cases of syphilis of the œsophagus come to the hands of the œsophagoscopist for diagnosis and treatment. I shall confine these remarks, therefore, to a description of syphilis of the œsophagus accompanied by the cardinal symptom of dysphagia.

Pathology.

Syphilis of the œsophagus occurs rarely in the congenital form of the disease. More commonly, in the so-called "secondary" stage, it may give rise to an œsophagitis, of such severity as to be manifested by dysphagia. The condition rapidly responds to appropriate treatment, and is very seldom followed by stenosis.

During the so-called "tertiary" period syphilis of the œsophagus is still more common, and takes the form of localised gummata. The gumma usually arises in either the upper or lower third of the canal, and on rupture produces a typical gummatous ulcer with a clearly cut edge and an unhealthy yellow base. There is considerable local induration, which, together with the concomitant spasm, is the main cause of the obstruction to the lumen. Leukoplakic patches may occur in the neighbourhood; some local non-specific œsophagitis may be present, together with a little hypertrophy of the wall and dilatation of the œsophagus above the level of the lesion.

Diagnosis.

The symptoms are those of painless dysphagia, together with those of any other syphilitic lesion which may coexist. If, however, there is any pharyngeal lesion, painful dysphagia occurs, together with some local spasm and regurgitation.

The previous history of a case is important, and leading questions must often be asked. The history of swallowing a corrosive or caustic or excessively hot fluid, or of an impacted foreign body, especially a tooth-plate, leads the clinician to doubt the existence of a true syphilitic lesion even in the presence of positive serological tests, and is more suggestive of a simple cicatricial stricture. The same is true of dysphagia following closely upon diphtheria or typhoid fever.

The duration of the dysphagia and its mode of onset is not of great value as an aid to an accurate diagnosis except when there is a definite history. Nevertheless, certain general facts should be borne in mind. Dysphagia in a case of syphilitic stenosis has usually lasted from four to twelve months before a careful examination reveals the true nature of the lesion. During this time the patient may or may not have been treated by his own medical practitioner for "indigestion," "gastritis," "gastric ulcer," "globus hystericus" or "nerves." Dysphagia of many years' standing, in the absence of a history indicative of simple stricture, is more suggestive of cardiospasm, but can be produced by a pharyngeal pouch, an œsophageal pouch, a fibrosis in the region of the crico-pharyngeal sphincter, a congenital stenosis of the œsophagus, or even by a syphilitic lesion. The onset of specific dysphagia is almost invariably gradual. Sudden difficulty in swallowing is more suggestive of an impacted foreign body or even of a malignant growth.

When syphilitic stenosis of the œsophagus is present there is usually nothing to distinguish it from any other variety of stricture except direct local examination. General examination will frequently reveal that the patient is suffering from syphilis, and there will be no clinical signs of malignancy, such as Virchow's glands. Especial attention should be paid to the mouth and throat, as signs of leukoplakia of the tongue or inner side of the cheek are rarely absent in long-standing cases. Scars are often found on the legs, and bilateral enlargement of the epitrochlear lymphatic glands, with no local condition to account for it, is always present.

Radioscopy.—After a complete general examination of the patient radioscopy is employed in order to exclude the presence of an aneurysm or other intrathoracic cause of extrinsic pressure upon the œsophagus, and to determine the level of the lesion.

Œsophagoscopy should next be resorted to, and great difficulty may be met with in making a purely visual diagnosis. This is especially so in the non-ulcerated variety of gumma, which closely simulates an infiltrating carcinoma. An actual ulcer is more readily diagnosed, and a portion removed for microscopical examination may reveal the true nature of the disease. The diagnostician must not be led astray by a negative Wassermann reaction of the blood, which is given by a very large proportion of sufferers from tertiary syphilis. The pathological examination of the cerebro-spinal fluid will, however, almost invariably confirm the clinical diagnosis of syphilis in this stage. On the other hand, a positive Wassermann reaction must not be taken to indicate that the condition is non-malignant, and therefore biopsy must always be performed. If in a doubtful case this fails to prove suspected malignant disease, it should be repeated. After two or more microscopic examinations have failed to reveal the true cause, and in the absence of a history indicative of a simple stricture, syphilis is to be strongly suspected. The diagnosis is usually confirmed by appropriate treatment.

I wish most strongly to emphasise that syphilis of the œsophagus must not be diagnosed by symptoms and serological tests alone, because many patients who have carcinoma of the œsophagus have also active syphilis. As I have shown elsewhere,[1] it is most important that cancer of the œsophagus should be treated at the earliest possible moment; direct œsophagoscopic examination must, therefore, be made in all cases with symptoms of an œsophageal disease.

FIG. 1. FIG. 2.

FIG. 1 (Case 1).—Syphilitic stricture of the œsophagus (cervical region) as seen through the œsophagoscope before treatment.
FIG. 2 (Case 1).—Seven days after dilatation with bougies.

Treatment.

Treatment is undertaken along two lines: (1) Anti-syphilitic treatment; (2) œsophageal treatment to combat the actual or potential stenosis.

1. In acute syphilis, arsenic is administered intravenously for eight weeks, provided it has not been previously used in large quantities in the same patient. If it has, then only a shorter course of arsenic should be given. The dose varies from 0·45 to 0·6 g. in the female, and from 0·6 to 0·9 in the male, at weekly intervals. At the same time as the arsenical injection an intramuscular injection of mercurial cream or bismuth is given. At about the middle, and at the end of this course of treatment, an intramuscular injection of 0·25 g. of contramine should be given. After the last injection of contramine the patient is allowed four weeks' rest from injections and given potassium iodide grs. 5 in plenty of water, three times a day by the mouth. After this, intramuscular injections should be recommenced, and continued once a week for eight weeks. They may consist of either gr. 1 of mercury as a mercurial cream given each week, or 0·2 g. of an oily suspension of bismuth. By far the best preparation of bismuth in my experience is iodo-bismuthate of quinine (Fraisse), and this may be used with benefit alternately with the injections of mercury. After eight injections the patient is given four weeks' treatment by medicine—either potassium iodide as before, or collosol sulphur, 1 drachm three times a day; then eight weeks on a heavy metal and four weeks on a non-metal, and so on. The arsenical treatment should not be repeated.

FIG. 5.

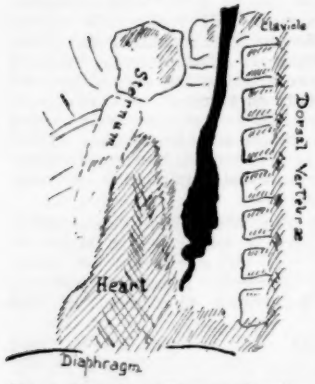


FIG. 5 (Case 2).—Diagram of radiogram of syphilitic stricture of œsophagus after swallowing radio-opaque emulsion.

In secondary syphilis this treatment should be continued for at least three years, and no notice whatever need be taken of the Wassermann reaction, whether positive or negative, during this time. In tertiary syphilis arsenic may be used, but its effect is not so good as in the early stages of the disease, and in my experience it is inferior to bismuth given as iodo-bismuthate of quinine (Fraisse). In tertiary and congenital lesions I strongly advise continuing injections of bismuth for at least four years, with four weeks' rest after each two months' injections; or alternate courses of injections may consist of bismuth for one course, mercury for the next, and so on.

FIG. 3. FIG. 4.

FIG. 3 (Case 1).—Two months later.
FIG. 4 (Case 1).—Eleven months later. (Since then no abnormality has been seen on œsophagoscopy.)

Œsophageal Treatment.

Every healed and healing gumma of the œsophagus is accompanied by fibrosis and contraction; therefore the œsophagus must be subjected to frequent dilatations during the early months of the treatment, but later this need only be done at rare intervals, in order to be quite sure that no further active contraction is taking place. In the first instance it should be done under direct vision and, if no contra-indication such as excessive dilatation or diverticulum is present, may subsequently be performed blindly.

FIG. 6.

FIG. 6 (Case 2).—Diagram of radiogram of same case as Fig. 5 taken one hour later.

Report of Two Cases of Syphilis of the Œsophagus.

CASE 1. — Female, aged 48. First attended at the Cancer Hospital, London, on June 30th, 1925, under Mr. Percival Cole, who kindly allowed me to undertake her investigation and treatment. This patient first noticed difficulty in swallowing in December, 1923, when she began to get occasional attacks of choking after taking solid food, and sometimes brought up food that had been swallowed. The symptoms became progressively worse until September, 1924, when she could only swallow liquid. She said she had been admitted to another hospital where the stricture was dilated. At that time the Wassermann reaction of her blood was positive, and she was given a course of N.A.B. (novarsenobenzol) injections, after which the Wassermann was negative. She was then free of symptoms until two months before I saw her at the Cancer Hospital, during which time the dysphagia became progressively worse. On admission she could only take very soft solids. Solid food appeared to stop at the lower part of the neck. There was no history of any previous illness or accident of any kind. She had one child, aged 19 years, and no miscarriages.

Physical Examination.—The patient was thin, but not cachectic. She said she had lost a little weight. Colour

[1] Abel, A. L.: The Treatment of Cancer of the Œsophagus, Brit. Jour. Surg., 1926, xiv., 53, p. 131.

good. Complete artificial dentures. Both epitrochlear glands were enlarged, but otherwise there were no clinical signs of any abnormality.

Radioscopy, July 2nd, 1925.—Patient could only swallow a teaspoonful or two of thin bismuth emulsion, which passed very slowly from the pharynx into the œsophagus. No other abnormality was detected.

Œsophagoscopy was performed on July 3rd. Immediately the end of the œsophagoscope had passed the cricopharyngeal sphincter a dense white fibrous stricture was seen, almost completely obliterating the lumen of the œsophagus. A large patch of leukoplakia was present on the right posterior wall of the œsophagus at the level of the stricture. A bougie was passed and the fibrous constriction seen to split. Three small bougies were left in situ for one hour. Four days later the patient was able to swallow easily. The appearance as seen by the œsophagoscope before instrumentation is shown in Fig. 1; as seen a week later in Fig. 2.

Bougies were passed, using gradually increasing sizes, every week or two. Fig. 3 shows the condition present in September, 1925. For the following nine months bougies were passed on an average once every two months. The appearance on June 7th, 1926, is shown in Fig. 4. Her antisyphilitic treatment has been carried out on the lines indicated above, and is still being continued. A large bougie was passed twice in 1927, and met with no obstruction. The patient has had no difficulty in swallowing since July 7th, 1925.

CASE 2.—Male, aged 55. First attended the Cancer Hospital on July 15th, 1925, and was kindly handed over

FIG. 7.

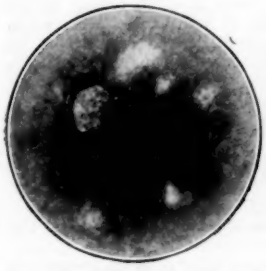


FIG. 8.

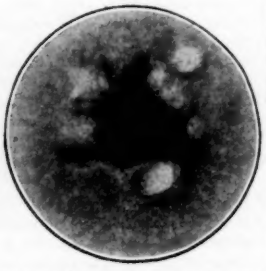


FIG. 7 (Case 2).—Syphilitic stenosis of the œsophagus (thoracic region as seen by endoscopy.
FIG. 8 (Case 2).—Two years later.

to my care by Mr. Ernest Miles. The patient complained of dysphagia, which had been gradually increasing for three months. He brought up solid foods immediately, but fluids were retained unless swallowed quickly. He said he frequently brought up a great deal of "phlegm." He had been losing weight and was a little constipated. He had had attacks of vomiting lasting for two or three days every three or four months for six years, and had been treated by his doctor for "indigestion." He admitted having syphilis 30 years previously, when he was treated with one bottle of medicine only. There was no history of swallowing a corrosive or foreign body, or of any other serious illness.

On examination he was well covered but somewhat anæmic. There was well-marked leukoplakia on the inner aspects of both cheeks, with enlarged epitrochlear glands. No other abnormality was detected on ordinary physical examination. His Wassermann reaction was found to be positive.

X ray examination with a bismuth emulsion on July 15th showed an irregular contraction of the œsophagus about four inches above the diaphragm, with some dilatation above (Figs. 5 and 6).

Œsophagoscopy was performed on July 21st, and the appearance was as shown in Fig. 7. The stenosis was 13 inches from the incisor teeth, and would admit only a very small sound. The mucosa was very red and inflamed, and bled easily. Patches of leukoplakia were seen on the inflamed surface with a small area of actual ulceration, which was thought to be malignant, and a portion was removed for microscopy. The stenosis was dilated, and a Symonds' tube left *in situ*. This was vomited two days later. Microscopic examination failed to show the presence of any malignancy, and the patient improved with occasional dilatation.

Two months later œsophagoscopy was again performed, and a second portion of the suspected growth removed for biopsy. The appearances were so strongly suspicious of malignancy that two tubes, each of 50 mg. of radium, were left *in situ* for six hours by means of an œsophageal catheter. As the second microscopic examination was also negative radium was abandoned; antisyphilitic treatment, together with regular dilatation by bougies, was commenced, and the patient improved rapidly. His antisyphilitic treatment has been continued ever since. Bougies were passed at first once a week, then once a fortnight, and then monthly, for nearly two years. The œsophagoscopic appearances as seen on July 14th, 1927, are shown in Fig. 8, and a radiogram taken at the same time is shown in Fig. 9. The patient still has a bougie passed about once every three months, and has no trouble with swallowing unless he gulps very large particles.

FIG. 9.

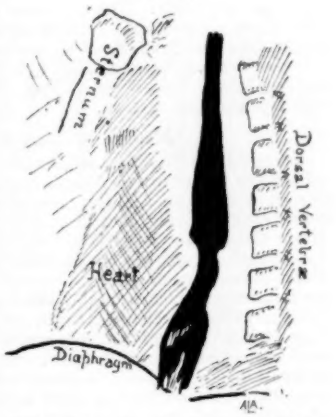


FIG. 9 (Case 2).—Diagram of radiogram of same case as Figs. 5 and 6 taken 18 months later.

The points which I wish to emphasise are: (1) Syphilis of the œsophagus is probably not so rare as a study of the literature would lead one to suspect. (2) Syphilis of the œsophagus is difficult to diagnose by vision alone, either from simple stricture or from a malignant growth. (3) One or more microscopical examinations must be made before pronouncing a case free from malignancy. (4) The patient or his relatives should not be told that he is about to die of cancer when only a specific stricture is present. Conversely, a patient with cancer of the œsophagus should not be given antisyphilitic treatment and energetic bouginage, and told that he will soon be quite normal. (5) Treatment must be by dilatation, as for any simple stricture of the œsophagus, and, in addition, very prolonged antisyphilitic treatment must be undertaken.

SKIN ANTISEPSIS WITH IODINE AND SOME NEW SOLVENTS.

BY R. A. MACDONALD, M.B. EDIN., D.P.H.,
ASSISTANT PATHOLOGIST AND RESEARCH FELLOW, HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET;
AND
J. WICLIFFE PECK, F.C.S., PH.C.,
PHARMACEUTIST TO THE HOSPITAL.

TINCTURE of iodine has long been employed for disinfecting the skin, and its uses as a skin dressing and before operation are almost universal.

Until recently rectified spirit has been the only solvent available as the chemical action of iodine on certain other solvents renders them unsuitable in every way. The extremely irritating vapours produced by the small amounts of methyl alcohol in methylated spirit make this solvent unusable. Methyl alcohol becomes oxidised by the iodine to formaldehyde and formic acid, which attack the eyes and nasal mucous membrane. It is even probable that acetic acid and other products are in course of time formed by the decomposition of ethyl alcohol with iodine, and it has been stated that old tincture of iodine has been known to burn the skin. Rectified spirit bears a very heavy duty, although the Customs and Excise grant a considerable rebate when it is used for medicinal preparations. It is on account of the heavy annual cost to hospitals that we have searched for a solvent that would replace it.

Any new solvent had to comply with the following conditions: (1) It should itself be antiseptic; (2) it should have penetrative powers when applied;

(3) it should not be harmful to the skin; (4) it should be stable; and (5) it should evaporate readily when painted on the skin.

Doubt has recently been expressed amongst surgeons as to whether iodine is an efficient antiseptic, and whether in the solution in general use the more important agent is not the spirit. It seemed advisable therefore to carry out some experiments to find out the actual bactericidal value of iodine in various solvents, as well as considering the relative merits of these solvents. The solvents used were as follows: Rectified spirit and ethyl alcohol, 70 per cent.; isopropyl alcohol, 90 per cent.; isopropyl alcohol, 70 per cent.; ethylene-glycol-mono-ethyl ether (for convenience hereafter called E.G.E.E.) and water with potassium iodide.

Method of Investigation.

In our investigation we made a number of solutions of iodine in other solvents, such as ether, petroleum ether, diacetone alcohol, sextone, sextol, as well as isopropyl alcohol and E.G.E.E., but it was decided that only the last two could possibly be used. Isopropyl alcohol is made from the gases emanating from petroleum wells by absorption in sulphuric acid and subsequent steam distillation. E.G.E.E. is made in the United States from ethylene obtained by "cracking" petroleum oils; the precise method does not seem to be known here. It is stated that ethyl alcohol is germicidal to *Bacillus coli* in 70 per cent. strength in two and a half minutes, and isopropyl alcohol in 30 per cent. strength in the same time. Iodine is said to kill *B. coli* in two and a half minutes in a strength of 1 in 50,000.[1] Ethyl alcohol is more active as a germicide in a strength of 70 per cent. than in any other concentration, being 30 times more powerful than 60 per cent., and 40 times more powerful than 80 per cent.[2] In our investigation the antiseptic properties of the solutions mentioned above were tested as follows: One series of experiments was made in vitro, using cultures of *B. coli* and staphylococci and the other directly on the skin to reproduce as nearly as possible the conditions obtaining at operation.

In vitro.—A measured quantity of each solution was added to an equal quantity of a 24-hour broth culture of each organism, and two drops of the mixture were abstracted by means of a sterile capillary pipette at the end of 1, 2, 3, 4, and 5 minutes. These were at once transferred to tubes containing approximately 3 c.cm. of broth and incubated over night. At the same time controls were put up containing two drops of culture and two drops of the antiseptic added separately. In the case of those solutions containing iodine this was neutralised by adding subsequently some sodium thiosulphate, in order to avoid any inhibition of growth of any organisms not killed by their period in contact with the antiseptic. (It was found later that the organisms grew perfectly in a medium containing two drops of iodine, although this gives a concentration of not less than 1 in 5000.)

On the Skin.—Areas of skin on the front of the forearm were selected, and marked off into segments with a grease pencil. As the majority of the antiseptics used had been found to be lethal to staphylococci and *B. coli* in one minute by the tube test, this period of time only was used. In each case an ordinary sterile throat swab was moistened in sterile broth and then rubbed hard on *part* of the selected area of skin. It was then transferred to a tube of broth and the latter incubated overnight. This served as a control to ensure that there were organisms on that particular piece of skin, before the addition of the antiseptic. The area of skin was then gently swabbed all over with the antiseptic in question. After one minute this area was again rubbed *all over* very thoroughly with a throat swab moistened in broth. The swab was again transferred to a tube of broth and this was incubated overnight. (N.B.—The amount of antiseptic carried over into the broth by this means must have been considerably less than the two drops used in the test-tube controls, and so in this case no further controls were added.)

Results of the Tests.

In the *tube test* growth was present in all the control tubes, but not in any case where one of the solutions had been in contact with the organisms, except ethyl alcohol 70 per cent. with staphylococci, where growth was present in all four tubes, and E.G.E.E. with staphylococci where growth was present in the first three tubes. In the *skin test* growth was present in all the control tubes, and also in all cases where the solvents had been used alone, without iodine. With none of the solutions containing iodine was any growth observed.

Isopropyl alcohol proved to be the most bactericidal of the solvents used, and no trace of irritation was noticed by either of us, after long periods of vigorous swabbing with this fluid. It is said to be twice as toxic as ethyl alcohol, but it is not absorbed to any appreciable extent by the skin or lungs.[3] The penetrative powers were tested along with the other solvents as follows:—

Areas of skin on the forearm, which had not been washed for six hours were sectioned off with grease pencil and well painted with the solution of iodine in the solvent in question, using a new camel-hair brush for each area. After the lapse of 30 minutes the forearm was swabbed with cotton-wool soaked in a 5 per cent. watery solution of sodium thiosulphate. The stains from iodine in 70 per cent. alcohol and 70 per cent. isopropyl alcohol were the most difficult to remove, the next being iodine in 90 per cent. alcohol, and the easiest being watery iodine, iodine in E.G.E.E., and iodine in isopropyl alcohol.

We had further to consider whether any decomposition would take place between iodine and the approved solvent. Isopropyl alcohol is $CH_3.CH.OH.CH_3$ and on oxidation yields acetone. We have failed to discover even a trace of acetone in our solutions of iodine in isopropyl alcohol, in bottles half full, that have been opened many times during a month. We think it would be advisable, however, in view of the possibility of oxidation, to recommend the use of comparatively recent solutions. Lastly, there is little difference between the evaporation rate of isopropyl alcohol and that of ethyl alcohol, the boiling point of the former being only 2–3 degrees higher than the latter.[3] Isopropyl alcohol, moreover, has quite a pleasant smell.

The relative costs of the solvents used in this investigation are as follows:—

Rectified spirit, after deducting the rebate allowed by the Customs and Excise, £2 13*s.* per gallon.

Isopropyl alcohol, in 10-gallon quantities, 13*s.* 6*d.* per gallon.

E.G.E.E., in 10-gallon quantities, 11*s.* 6*d.* per gallon.

Isopropyl alcohol 70 per cent. would be approximately 10*s.* 6*d.* per gallon, and if used generally in hospital would produce a saving of about 85 per cent.

Conclusions.

Our conclusions, therefore, are: (1) that iodine in the strength of 1·25 per cent. is in itself an efficient antiseptic; (2) that isopropyl alcohol is the most antiseptic of the solvents used in this experiment; (3) that iodine 1·25 per cent. in isopropyl alcohol is not harmful to the skin; (4) that its penetrative powers and evaporation rate are equal to those of ethyl alcohol; and (5) that its cost is very much less than that of rectified spirit. We therefore strongly recommend iodine 1·25 per cent. in 70 per cent. isopropyl alcohol as a substitute for the commonly used iodine in rectified spirit.

We wish to thank Dr. D. N. Nabarro, director of the pathological department, for permission to carry out this work, and for his kind interest and assistance.

References.—1. The Extra Pharmacopœia, Martindale and Westcott, 1925, vol. ii., p. 368. 2. Beyer, A.: Apoth. Zeit., 1912, p. 27. 3. The Extra Pharmacopœia, vol. i., and the British Pharmaceutical Codex.

THE RATING OF HOSPITALS.—The County Valuation Committee for Cornwall has decided to assess hospitals at a uniform rate of 7*s.* 6*d.* per bed, but the Truro Rural Rating Committee has resolved not to demand rates from hospitals and similar institutions.

NEW HOSPITALS FOR EGYPT.—The Egyptian Government has adopted a scheme for the provision, at a cost of £1,500,000, of 100 hospitals in various towns and villages, to be completed within the next five years. These institutions will be open to all classes of the population, but especially to the fellaheen, who will thus no longer be compelled to travel long distances to the nearest hospital.

Clinical and Laboratory Notes.

A NOTE ON THE SO-CALLED WHITE LINE OF ADRENAL INSUFFICIENCY.

By A. Muir Crawford, M.D., F.R.F.P.S. Glasg.,
ASSISTANT PHYSICIAN, GLASGOW ROYAL INFIRMARY.

In certain individuals, if the skin is lightly stroked with the pad of the finger or the smooth rounded end of a fountain pen, a band of pallor is produced in the area of skin corresponding to the part stimulated. This phenomenon was closely studied by Sergent,[1] who regarded it as a valuable clinical test. He considered it to be pathognomonic of adrenal insufficiency and termed it "the white line of adrenal insufficiency" (*la ligne blanche surrénale*). Considerable interest has been shown in the reaction, notably among French clinicians, and reference to the subject is to be found frequently in French literature. In this country and in America, several workers have investigated the reactions produced by cutaneous stimulation, with results which apparently show that the reaction is of no clinical value as a sign of adrenal insufficiency. Thus, Cotton, Slade, and Lewis,[2] in an elaborate investigation on the phenomena of dermatographism carried out on soldiers affected with "irritable heart," refer to the remarkably sharp outline of a white band produced by stroking the skin with the end of a flat ruler in a susceptible subject. Their observations were made with special reference to the effects of pressure of a blunt point drawn firmly over the skin. This invariably demonstrated the appearance of a red tache of varying intensity, with or without borders of distinct pallor, and they concluded that the variations in the type of reaction could be attributed to differences in the grade of pressure. In many of their cases light pressure produced a simple white line, whereas, in other cases, light pressure was either without effect or produced a transitory red band. Wright,[3] working in the Physiological Department of the Middlesex Hospital Medical School, has investigated the significance and value of Sergent's white line by applying the test to healthy subjects. He carried out the test on 100 young medical students and in each case recorded the systolic and diastolic blood pressures. A positive result was obtained in 66 per cent. of the tests, and his observations led him to the conclusion that the white line of Sergent is a phenomenon occurring in a large proportion of normal subjects, that it is not related to adrenal insufficiency or to abnormally low systolic or diastolic blood pressure, and is, in fact, without pathological significance.

Personal Observations.

In order to test further the value of the phenomenon I thought it might be of interest to carry out the test on hospital patients of different ages and affected with different types of disease. Tests were, therefore, carried out on 100 ward patients in the Glasgow Royal Infirmary. The patients were affected with the usual diseases seen in a general medical ward, and no selection was made of either patient or type of disease. The test was carried out by lightly stroking the skin of the anterior abdominal wall with the smooth rounded end of a fountain pen, due attention being paid to the details of the Sergent technique. After a few preliminary observations it was decided to record the results as follows:—

1. *Negative*, where there was either no result or where the stroking was followed by a red line.
2. *Positive* +, where there appeared a definite but not marked band of pallor.
3. *Positive* ++, where there appeared a very marked white band with clear-cut edges.

This method of recording the results is very similar to that employed by Wright. Although accurate time observations were not made, it was generally found that a positive reaction appeared in about 20 to 30 seconds and lasted for one to two minutes. The following tables show the results obtained. Of 100 cases examined, 49 per cent. gave a positive reaction (14 per cent. were positive ++, and 35 per cent. positive +), while 51 per cent. were negative.

TABLE I.—*Showing Results in Relation to Age and Sex.*

Age in years.	Sex.	P. ++	P. +	N.
10 to 20 ..	M.	0	5	3
	F.	3	6	4
21 to 35 ..	M.	6	7	3
	F.	2	8	3
36 to 50 ..	M.	1	3	12
	F.	2	2	4
Over 50 ..	M.	0	4	16
	F.	0	0	6

P. = Positive. N. = Negative.

An examination of Table I. shows that a positive reaction was obtained far more frequently under 35 years of age than over. This is in accordance with the results obtained by other observers. Thus, Kay and Brock [4] state that the white line occurs most frequently in young adults of either sex. In my series, in 29 patients between the ages of 21 and 35 years, 79·3 per cent. gave a positive reaction, while in 50 patients between the ages of 36 and 74 years, only 24 per cent. were positive.

TABLE II.—*Showing Results in Relation to Type of Disease.*

Disease.	P. ++	P. +	N.	Disease.	P. ++	P. +	N.
Gastro-intestinal	1	9	14	Diabetes m. ..	1	3	2
Respiratory ..	2	7	15	Blood	0	0	4
Exophthalmic goitre	4	0	1	Renal	2	5	4
Rheumatic ..	0	2	2	Cardiac	2	4	3
				Nervous ..	2	4	3
				Miscellaneous	0	1	3

Diabetes m. = Diabetes mellitus.

The only criticism I have to offer on these results given in Table II. is that in four cases of exophthalmic goitre the reaction was obtained in a very marked degree; in fact, they showed a white band more intense than that obtained in any other disease. This tends to support the hypothesis formulated by Tracy [5] that the white line is a manifestation of sympathicotonia.

TABLE III.—*Showing Results in Relation to Blood Pressure.*

—	P. ++	P. +	N.
Average systolic pressure ..	119	117	122
Average diastolic pressure ..	69	72	73
Average pulse pressure	50	45	49

A glance at Table III. shows that no definite relationship can be demonstrated between blood pressure or pulse pressure and type of reaction.

Conclusions.

As a result of these observations and from the reports published by other investigators it would appear that (1) the white line of Sergent is a phenomenon which may be readily demonstrated in a large percentage of young adults; (2) it bears no relationship to the sex of the individual; (3) it bears no relationship to the blood pressure and is not pathognomonic of adrenal insufficiency; (4) it bears no relationship to any particular type of disease, although

sometimes it may be specially marked in certain pathological states not connected with adrenal insufficiency.

References.

1. Sergent, Emil: Presse méd. (Paris), 1903, xi., 813; Endocrinology, 1917, i., 18.
2. Cotton, T. F., Slade, J. G., and Lewis, T.: Heart, 1917, vi., 223.
3. Wright, Samson: THE LANCET, 1922, ii., 14; Endocrinology, 1922, vi., 493.
4. Kay and Brock: Amer. Jour. Med. Sci., 1921, clxi., 555.
5. Tracy: Boston Med. and Surg. Jour., 1916, clxxv., 187.

NON-SPECIFIC PROTEIN THERAPY IN ERYSIPELAS.

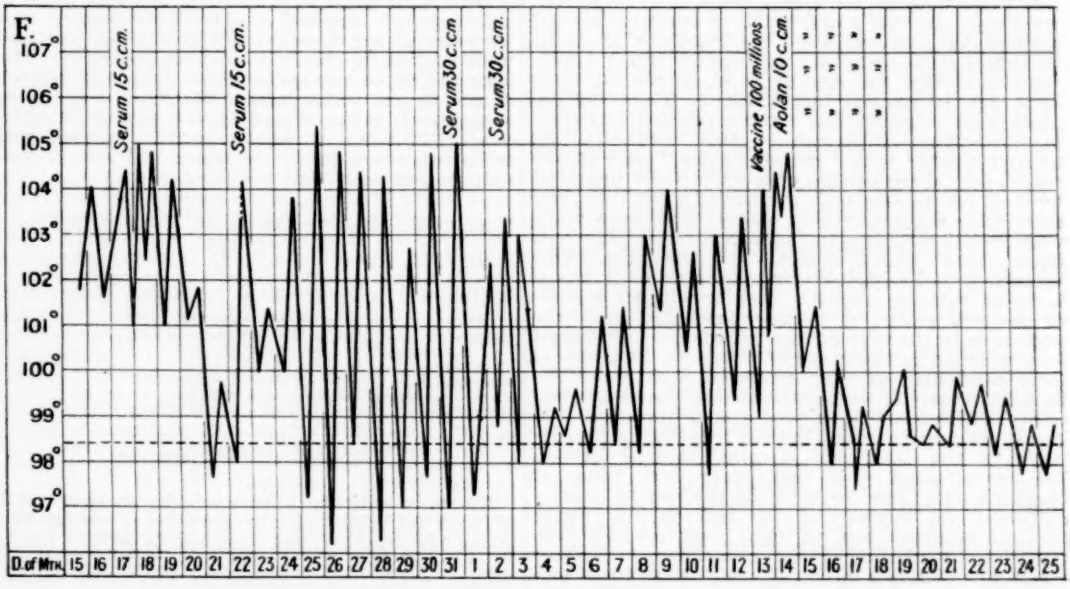
BY HENRY C. SEMON, M.D. OXF., M.R.C.P. LOND.,
PHYSICIAN, DISEASES OF THE SKIN, ROYAL NORTHERN HOSPITAL.

THE respective potencies of specific as opposed to non-specific protein therapy, both of acute and chronic infections, are still sub judice, and the adherents of the former doctrine could doubtless produce examples in support of their contentions as striking as the one here submitted. The writer holds no fixed views in the controversy; his object is merely to call attention to a very harmless and sometimes exceedingly effective means of stimulating to their utmost capacity the natural protective mechanisms against disease.

A middle-aged married lady had suffered from an aural furunculosis for about three months. On May 15th last, on her return from the seaside, she appeared to have caught a chill, and on the following day at noon she went to bed with a temperature of 102° F. She complained of deafness and a feeling of fullness over the right ear and cheek. On the 17th an erysipelatous eruption appeared in those situations, and during the course of her illness in the following weeks wandered over the scalp and the rest of the face in an irregular manner. Each extension appears to have been associated with rigors and increase in the temperature.

An injection of antistreptococcal serum was given on May 17th, but there was no fall in temperature until May 21st. A second injection, given on the following day, appeared to have some effect, but doubled doses on the third and fourth days produced no result. Two attempts to grow the organisms from the blood were unsuccessful, and the injection of a stock vaccine on June 13th appears to have been followed by an even higher temperature, almost 105°.

The patient was very ill indeed when I was asked to see her in consultation on June 14th, the thirty-first day of her infection. She had a running pulse of 130, a temperature of 105°, and was almost comatose. It was very difficult to rouse her, and there was complete loss of control of the sphincters. The erythematous rash on the scalp and face was slightly œdematous in places, but had not the typical sharply defined raised edge of text-book descriptions. Nevertheless, the rest of the picture left no doubt of the nature of her infection. My first suggestion, to give an intravenous injection of gr. 1/16 of perchloride of mercury, was opposed by one of the consultants on the ground that she had mitral stenosis and probably some valvular vegetations, which he believed he had seen detached by this procedure in another case. No objections were raised to the intramuscular injection of 10 c.cm. of aolan, a germ- and toxin-free derivative of cow's milk, which is put up in 5 and 10 c.cm. ampoules by the firm of Beiersdorf, in Hamburg. The injection was made into the buttocks, 5 c.cm. intramuscularly, and another 5 c.cm. into the fascial planes over the glutei. No harmful effects were observed at the time, and that same evening the temperature fell to 101°. 10 c.cm. were given on the three following days, and 5 c.cm. on June 17th and 18th. The effects on the temperature are well illustrated by the chart, and the improvement in the general condition proceeded pari passu with the fall of temperature. The eruption on the scalp and forehead did not appear to be influenced to the same extent, but this was at no time a very striking feature of the case, and gradually involuted under local applications of a weak solution of ichthyol and lead.



Temperature chart of a case of erysipelas, showing improvement under the influence of aolan.

The recovery was so striking that the case seems worthy of record.

A NEW CULTURE MEDIUM.

BY C. Y. WANG, M.D., F.R.C.P. EDIN.

(*From the School of Pathology, University of Hong-Kong.*)

THE following preparation is the outcome of a series of experiments I have had occasion to conduct, whilst studying certain aspects of the biological properties of bacteria, for the purpose of raising early and abundant growth:—

Trypsinised defibrinated ox blood	10 parts.
,, plain bouillon	8 ,,
,, plain milk medium	4 ,,
Beaten whole egg	10 ,,

Preparation of the Medium.

The defibrinated blood should be fresh, but need not be obtained with aseptic precautions. For trypsinisation, to every 10 c.cm. of blood add 0·2 c.cm. of liquor pancreaticus (Benger's). The treated blood is left overnight (18–24 hours) at 37° C., but should be occasionally shaken during the first few hours of incubation. The bouillon is the ordinary peptone broth made with meat extract and adjusted to the usual reaction. Trypsinisation is effected by adding 0·16 c.cm. of liquor pancreaticus to every 8 c.cm. of broth, leaving to stand overnight at body temperature. Strict aseptic precautions are to be observed in this procedure, at the end of which the broth should remain clear. The milk medium is similarly prepared and should show practically no change in reaction. After being trypsinised the three fluids are well mixed with the beaten egg, and the whole mixture is strained through gauze or muslin and distributed in tubes. These are sloped in an inspissator, so heated as to take 3½–4 hours to reach 75° C., at which temperature they remain for 15–30 minutes before being autoclaved at 120° C. for 20 minutes.

Growth of Various Organisms.

On this medium the growth of the tubercle bacillus is rapid at body heat. In subculture the minute colonies, somewhat raised above the surface and plainly visible to the naked eye, soon become confluent and nodular in appearance. Examined microscopically the organisms present marked pleomorphism, some appearing as beaded bodies 15–20 μ in length, a few of them so disposed as to give the appearance of a chain of streptococci. Here and there, at one or both ends of the organism, detached beads appear as minute cocci. Other organisms are seen as irregularly disposed rounded bodies, as small as *B. melitensis*.

The pneumococcus grows very rapidly on the medium. When sown from a loopful of a thin emulsion, scarcely turbid to the naked eye, it yields in 12–16 hours an abundant growth of colonies which in 24–36 hours become flattened out, appearing as glossy patches. The organism tends to retain its viability for many weeks, if evaporation is prevented. The growth far surpasses that obtained on other media, such as blood-agar or solidified serum.

The streptococcus thrives extremely well. Unlike those of the pneumococcus, the colonies do not tend to flatten out.

The diphtheria bacillus develops readily; at 12–24 hours after incubation the colonies are more numerous than those seen on Löffler's serum.

The medium has also been found favourable for the growth of other bacteria, such as the meningococcus, hæmophilic bacilli, and the organisms of glanders and plague.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL.—The annual report states that the new buildings at the country branch at Brockley Hill, Stanmore, are now occupied and provide 90 additional beds, with an operating theatre and other accommodation. There are now 214 beds at Stanmore, and the King's Fund has promised a further £1000 towards the provision of another 50 beds there. An additional 70 acres of land have been purchased which will not only provide for future extensions, but will ensure the maintenance of the rural character of the hospital.

FLORENCE NIGHTINGALE FUND.—The annual report of the Florence Nightingale Fund School at St. Thomas's Hospital states that last year there were 156 probationer nurses under training. Of these, 70 were taken on as extra nurses to complete their training, 37 completed their term and received certificates, and only 13 resigned or were discharged as unsuitable. The fund was raised after the Crimean war in recognition of Miss Nightingale's services and has an income of £2000 a year. It claims to give the best training a nurse can receive, and, owing to the demands upon the staff for important outside posts, the matron has been compelled for the moment to refuse to allow further drafts to be made upon it.

Medical Societies.

ROYAL INSTITUTE OF PUBLIC HEALTH.

DUBLIN CONGRESS, AUGUST 14TH–20TH, 1928.

MEMBERS were received at the Mansion House by the President, General R. Mulcahy, Minister for Local Government and Public Health, President Cosgrave being among the hosts. At the inaugural meeting a further welcome was given by Mr. Seamus Murphy, the Chief Commissioner of Dublin, who was supported by the Vice-Provost of Trinity College, the President of the National University College, Dublin, and the Presidents of the Royal College of Physicians, the Royal College of Surgeons, and the Apothecaries' Hall, Ireland. General Mulcahy, in his opening address, referred to the problems in front of the Free State, remarking that they were watching with interest the results of the English inquiry into maternal mortality. He also acknowledged the generosity of the Rockefeller Foundation in aiding the establishment of efficient county public health services. General Mulcahy was presented with the Honorary Fellowship of the Institute by Sir Thomas Oliver, and the opening session terminated with greetings from many overseas delegates.

SECTION OF BACTERIOLOGY, PATHOLOGY, AND BIOCHEMISTRY.

Prof. JAMES M. BEATTIE gave a presidential address entitled Public Authorities and Research, which was printed in THE LANCET last week (pp. 430–31).

Prof. W. D. O'KELLY (University College, Dublin), who followed, while agreeing in general with Prof. Beattie, thought the problem was how to convince the local authorities that this was going to be an economic proposition.

Prof. J. W. BIGGER (Trinity College, Dublin) had something to say in favour of institute research, for the individual was able to consult at any stage with experts in other lines. Further, he himself favoured pure research and did not think Dr. Beattie distinguished sufficiently between research and investigation. It would be difficult in Ireland, he thought, to persuade the local authorities to spend money on research. Dr. Bigger went on to read a paper entitled the Expectation of Life and the Bacteriological Laboratory (which also led up to the question of the endowment of research). He compared the deaths in Ireland from 20 groups of diseases in 1875 and 1925 respectively. He showed that in 15 groups there had been a fall in the death-rate and in 5 a rise. In 13 of the 15 cases the falls were in bacteriological diseases, whereas in only 1 of the 5 "rises" was the disease a bacterial one. Bacteriology had saved very many lives and would in time save very many more. In Ireland, however, the public health authorities had not even applied the incomplete knowledge which we possessed at present. Ireland lagged behind in the provision of laboratory facilities for diagnosis and for the detection of carriers, and had made no use of recent advances in diphtheria and scarlet fever.

Dr. NORAH H. SCHUSTER (pathologist, Royal Chest Hospital, London) read a paper on primary carcinoma of the lung. She produced evidence that there was a real increase in this disease in London and stated that a similar increase had occurred in various foreign cities.—Dr. BEATTIE pointed out that in a large experience he had never seen this disease associated with the pneumoconioses of the Sheffield grinder.—Prof. W. BOXWELL (Dublin) stated that primary carcinoma of the lung was very rare in Dublin.—Prof. J. T. WIGHAM (Dublin) suggested that an investigation as to why this disease was rare in one place and increasingly prevalent in another might lead to interesting results.

In another paper Dr. BIGGER dealt with the bacteriological control of shell-fish, describing a method adopted by him for determining the fitness of shell-fish for human consumption, which was essentially a modification of Klein's. He referred to the discordance between the results obtained by him acting for the Department of Fisheries and those obtained by Prof. J. W. Eyre for the Fishmongers' Company. He believed that the divergent results were chiefly due to chance in the selection of shell-fish and chance in the selection of the particular fraction of shell-fish fluid examined. He thought his own method gave more reliable and just as rapid results as the Houston-Eyre method.—The desirability of the adoption of a uniform standard was brought out by the discussion.

Dr. GEOFFREY BEWLEY (Adelaide Hospital, Dublin), in a paper on the Schick test, showed that the mortality from diphtheria had always been smaller in Ireland than in England and Scotland. The rates in England and Scotland, however, had recently been greatly reduced, whilst that in the Free State had been practically stationary. The number of Schick reactors was probably proportionately greater in the Free State than in England. In the Adelaide Hospital 54 per cent. of the nurses were positive, as compared with an average figure of 25 per cent. for English hospitals. From this he inferred that the soil was prepared, and that diphtheria might at any time assume epidemic proportions in the Free State. The prophylactic inoculation of the children was, therefore, worthy of consideration.

Prof. BLAIR BELL (Liverpool) claimed that the clinical results of combination of the lead and X ray therapy for cancer is better than those obtained from either alone. He reviewed their 1925 statistics in the light of subsequent history. Of 31 cases which were believed to be cured 3 had since died, 2 from intercurrent disease, and 1 from recurrence. The remainder were alive and healthy.—Dr. LESLIE CUNNINGHAM described the toxic effects of intravenous lead and emphasised the need for careful study of the variation in functions of the liver during the treatment.

SECTION OF CHILD WELFARE.

Prof. A. LOUISE MCILROY (London), in her presidential address on the Progress of Midwifery in the Present Century, referred to Dublin as the Mecca of obstetrics. Bedside teaching in the three great hospitals was given by experts. There had been much advance in antenatal work between 1900 and 1925. Obstetrics, once the Cinderella of medicine, raised to a science, would promote the dignity of motherhood and the saving of child life. She referred gratefully to the pioneer work of Ballantyne, of Edinburgh, and proceeded to deal with changes wrought by antenatal supervision. Disease in expectant mothers was now treated as disease complicated by pregnancy rather than pregnancy complicated by disease. Wonderful results had accrued from the work of a special heart clinic for pregnant women at the Royal Free Hospital. Rational treatment had been introduced for eclampsia to take the place of induction of labour and high forceps cases with their great mortality. To this change Dr. Hastings Tweedie, of Dublin, had contributed much. Research had been promoted as to the normal and the abnormal. Decayed teeth might give rise to eclampsia and toxic symptoms, therefore the work of a dental clinic for expectant mothers was extremely important. X ray examination was invaluable for removing doubt as to pregnancy, &c., though some might question the advantage to the mother of learning a few months beforehand of the advent of triplets, against which risk insurance companies had now refused to insure. Practice was taking the place of lectures in the teaching of medical students. There should be, now, few emergencies in homes unsuitable for complicated labour. The spreading of this knowledge would help the cause of better housing and the demand for more skilled attention for mothers. Hurried labours should become a thing of the past. She had found gas and oxygen the ideal anæsthetic for labour and, in reply to a question, mentioned that a portable apparatus for the purpose was being worked out with promise of success. Although there was as yet little improvement in sepsis mortality, septic morbidity was becoming less. For sepsis she used glycerine drainage with vaccines and open-air treatment. Hopeful research as to vaccines was in progress based on the Dick tests. She believed in serum rather than autogenous vaccine. Since the draining of the uterus by glycerine had been introduced, the douching of the uterus and vagina had been discarded, but in certain cases intestinal lavage was good. The treatment of venereal disease in pregnancy prevented the birth of syphilitic babies and gonorrhœal ophthalmia. Through postnatal clinics and preventive midwifery they would ultimately have more maternity and fewer gynæcological beds, as 50 per cent. of the gynæcological beds were at present filled by conditions due to bad or meddlesome midwifery. The sacrifice of the child by induction of labour was very seldom necessary. Hyperemesis and retroversion of the gravid uterus ought not to be, as formerly, common causes of abortion. In seven and a half years in the Royal Free Hospital they had had no case of craniotomy, owing to improved Cæsarean technique or antenatal work. Subsequent normal labour might occur after Cæsarean section with the scar still holding. The same antenatal care was good for both mother and child. Considering its aims, obstetrics was the greatest subject in medicine, and the new teaching must be spread to the Connemara mothers.

The claims made by Dr. McIlroy for antenatal treatment received ample confirmation in later papers.—Dr. LOUIS CASSIDY (Master, Coombe Hospital) pointed out that 30 per cent. of pregnant women needed much care throughout pregnancy. Early abortion was preventable. In seven years at the Coombe they had only had two deaths from pernicious vomiting and both these cases were moribund on admission. By early treatment with rest in bed and a suitable vitamin-rich diet much could be done to avert fœtal death and trouble from kidney disease. Contraction of the pelvis was becoming rarer. In the prevention of autogenous sepsis attention to septic teeth, the nasopharynx, and the bladder were important. There should be no vaginal examination in normal cases. For the education of the medical student three months' residence in a maternity hospital should be required. Obstetricians should make a more determined effort to secure representation on the General Medical Council. Preventive midwifery would abolish craniotomies and make Cæsarean sections comparatively rare. Women must be persuaded to go early to the antenatal clinics.

Dr. N. FALKINER mentioned that at the Rotunda, breech presentations were only rectified if this could be done easily by external versions. They had had living babies in all their last breech deliveries.—Dr. A. W. SPAIN (National Maternity Hospital) considered that there were good antenatal facilities for the poor and, he believed, the rich also availed themselves of antenatal advice, but the middle class did not. They must educate the public through the medical officers of health.—Dr. BETHEL SOLOMONS (Rotunda) thought that antenatal clinics should only be held at maternity hospitals. Every woman should have antenatal care and the private practitioner's fee should include this. He criticised severely the rule of the Central Midwives Board making vaginal examinations by midwives compulsory. The rectification of breech presentations might result in the death of the baby by the twisting of the cord and give rise to the separation of the placenta. He believed that the results obtained in the maternity hospitals of Scandinavia and Dublin were the best in the world.—Dr. G. W. FITZGERALD (Manchester) advocated that part of the improved training of

the medical student should be post-graduate. He emphasised the fact that the theory of autogenous infection was a dangerous doctrine. Other points made were that antenatal clinics, if not always held at maternity hospitals, should at any rate be conducted by experts, and that, if possible, the confinements should be conducted by those who had done the antenatal examinations.

The discussion brought out the fact that two-thirds of the births in Dublin were attended through the intern and extern departments of the three hospitals, and a resolution was passed requesting the masters to consider the preparation of statistics on a considerable scale which would establish the value of antenatal work.

School Medical Service.

Dr. J. A. HARBISON (Kildare), after describing the aim of preventive medicine as medical "supervision from conception to corruption," went on to show what gaps needed to be filled. They wanted nursery schools like the McMillan to teach habits to the toddler, and they wanted health education for older scholars.—Dr. T. S. FULTON (Belfast) emphasised the unhygienic condition of many of the schools. In Belfast they had much leeway to make up. Out of 186 schools only seven were really good. They were endeavouring to renovate five every year at a cost of about £30,000, and expenditure on nursery schools was at present starved out in Belfast, though the need for them was recognised.—Both speakers deprecated hurried examinations and the undue importance attributed to statistics. The need for the education of the public and of education authorities in the wide difference between a nursery school and the ordinary infants' department of an elementary school was emphasised in the discussion.

Dr. A. DINGWALL FORDYCE described the beginning made in Liverpool in the supervision of the rheumatic school-child by means of a hospital clinic coöperating with the public medical services. Many more residential beds and convalescent homes were needed on Merseyside for this work. Head-teachers should be fully notified how to deal with each rheumatic child.—Dr. CATHERINE CHISHOLM (Manchester) from her experience said that rheumatic febrile attacks in the 1–5 age period could be discovered if sought for.—Dr. LETITIA FAIRFIELD described the scheme for rheumatic children carried out by the coöperation of Guy's Hospital. They had special classes in the "physically defective" schools for such cases and taught them a suitable trade from 12 years old onwards. An important point made in the discussion was that school medical officers, like tuberculosis officers, should be in some way attached to hospitals and thus given a wider clinical field. Dr. Fairfield gave an extremely interesting account of the working of the L.C.C. scheme for mentally defective children, and in replying to a vigorous discussion she said there had been no dull and backward in the London M.D. schools during the last ten years. She further said that mongols were admitted to the M.D. schools, but that their education was a waste of money. She wished something could be done to correct the impression that thyroid was beneficial to mongols, as absolutely fallacious hopes were aroused in parents. Modern opinion was dead against sterilisation. Those for whom sterilisation was justifiable also needed confinement.

OTHER SECTIONS.

Some 80 contributions, a large proportion of which were from representatives of the Free State, official and non-official, were discussed at the five sections and their various subsections.

Prof. P. ABERCROMBIE (Liverpool) dealt with town and rural planning, and referred to the modern anti-social phenomenon of "ribbon" building. He advocated instead the grouping of houses on side roads at right-angles to the main artery, so as to secure compact communities.—Mr. J. WEBB (President of the Royal Institute of Architects of Ireland) pressed the urgency of planning for all the towns and rural areas of Ireland.—Mr. GEORGE BECKETT (Vice-President R.I.A.I.) said his institute has been pressing the Government during the last five years for planning measures. He believed that the city commissioners were quite alive to the importance of planning but that the Government was not.—Dr. W. C. DWYER (one of the three Dublin commissioners) pointed out the urgent need for town planning in Dublin, and emphasised the disastrous effect of bad housing on education.—Mr. MANNING ROBERTSON, M.R.I.A.I., said that Ireland lagged hopelessly behind the Continent in town and regional planning, and that a comprehensive planning Act was needed. Fortunately for Ireland, he said, they had not inherited the legacy from uncontrolled industrialism that was the despair of England's housing reformers. He moved a resolution, which was accepted by the section, recommending the Government to set up a planning commission for the development of the Free State as a whole.—Mr. W. J. BYRNE (Dublin Commercial Utility Society) showed how much could be done by utility societies if the local authorities throughout the Free State would grant to them the facilities provided for under the various housing acts.—Mr. H. T. O'ROURKE (city architect) outlined the activities of the Dublin Corporation. Modern methods of dealing with the housing problem in the congested areas of old towns were so hopelessly uneconomic that he had practically reached the conclusion that free housing was as necessary as free education.—It was clear from the discussion that the spoiling of the country-side, although it had not reached so advanced a stage as in England, was quite sufficient of a menace in the Free State to provoke vigorous protests. In order to deal with this menace Mr. R. M. BUTLER (Professor of Architecture, University College, Dublin) urged that "committees of taste," composed of architects, artists, road engineers, and business men should be set up in every district.

Dr. GERALD LEIGHTON (Scottish Board of Health) advocated a great extension of the fixing of standards for foodstuffs.—Mr. J. H. NORRIS (Director of Veterinary Research) estimated that 20 per cent. of the Irish dairy cattle were tuberculous and strongly supported the recommendations of the Free State Inter-departmental Committee, which included veterinary inspection of dairy cattle, the extension of the tuberculosis order, and the grading of milk.—That the Free State will be able to profit by our experience and secure a better nomenclature for graded milks was pointed out by Mr. J. MCALLAN (Chief Veterinary Inspector, Aberdeen).—A joint contribution from Dr. E. G. GIBB-SMITH (M.O.H., Teddington) and Dr. F. HOBDAY (Principal, Royal Veterinary College) drew attention to the unsatisfactory form of bottle used for milk and to its inefficient capping. The authors also suggested the possibility of destructible containers for milk.

Dr. P. C. VARRIER-JONES, in his presidential address, referred to the failure of sanatoriums to cure tuberculosis. Sanatorium treatment only touched the fringe of the matter. The crux of the question was the provision of suitable employment under sheltered conditions with facilities for treatment when required. Village settlements, such as Papworth, fulfilled these requirements.

A TUNBRIDGE WELLS CENTENARY.—The centenary of the Tunbridge Wells General Hospital was observed during the week ended August 18th, when funds were raised towards the £100,000 needed for the building of a new hospital at Great Culverden, Mount Ephraim. In 1926 the governors agreed to mark the centenary by beginning the erection of a new building, instead of spending many thousands of pounds in extensions. The new hospital, which will have 150 beds, will combine the eye and ear hospital, now in its fiftieth year, and a considerable portion of the £100,000 needed will accrue from the sale of the two sites. Building is to be started in a few months.

Reviews and Notices of Books.

FROM MAGIC TO SCIENCE.

By CHARLES SINGER, M.D., D.Litt. Oxf., F.R.C.P. Lond. London: Ernest Benn, Ltd. 1928. Pp. 253. 25*s*.

THESE essays deal with what their author terms poetically "the scientific twilight," and have all been printed at various times during the last ten years. But as they are scattered through various publications, some of which are not easily accessible, and as they represent a continuous development of a single line of thought, Dr. Singer has been well advised to bring them together with such modifications from the original form as later publication warranted. We have thus set out what may be called the story of early accomplishment in natural philosophy, as human knowledge groped its way from myth to something of exactitude.

The first essay briefly describes science under the Roman Empire. The author shows the superficial nature of the resemblance of the Lucretian theory to modern atomic views, and gives proper credit to Pliny and Seneca as the two founts of ancient Roman learning whose written works were not lost during the dark ages. Pliny's credulity, however, in medical matters deserves the exposure which it receives. The position of Celsus is accurately described, with much interesting information on the Roman hospital system and the growth of hygienic ideas from prehistoric times. The "Dawn of Science," the subject of the second essay, receives no particular date, but Dr. Singer suggests that we may fix the end of Antiquity and the beginning of the Middle Ages for science at the end of the fourth or the beginning of the fifth century. The lowest degradation of the human intellect in Europe generally may be placed in the tenth century, after which a slow ascent can be discerned. By the thirteenth and fourteenth centuries there is considerable expansion of natural knowledge, and Dr. Singer places the limiting date of the mediaeval attitude towards nature as 1543, and gives his reasons in great detail, which should be read in connexion with an informing chronological pedigree of mediaeval science. Three hundred years earlier the first truly scientific wave which our comparatively modern world experienced marked the arrival of Roger Bacon, while it need hardly be said that Leonardo da Vinci, Paracelsus, and Vesalius are in the pedigree, the last named being contemporary with the critical year. A chapter on the Lorica of Gildas the Briton introduces a subject of medical interest which will be novel to most readers. The lorica was literally a coat of mail, but the word was used for religious spells or invocations of a protective character. The most famous of the loricæ was that attributed to St. Gildas, which is Celtic in character and of date about 600—there is doubt about the exact period. It appeals to the Trinity and to the Hosts of Heaven in 47 stanzas which form a catalogue of the various parts of the body, and lest the compiler should have omitted any part he asks that other members of the body should be held to cover the names of which he has perchance left out. As the chief interest in the Lorica of Gildas is the extraordinary vocabulary of foreign words, the origin of many of which are obscure, Dr. Singer adds very full notes on them which, as he explains, give an idea of how, at certain cultural stages, any phrase or idea that is foreign or strange can be enlisted by the magician for his purposes. An appendix to the chapter describes the six known manuscripts of the Lorica of Gildas, one of which is in the British Museum and forms mainly the text for the essay. In the last essay, which deals with some of the legends which gathered round the school of Salerno, Dr. Singer questions the suggestion that that centre of learning gave free access to women, and states how one of its alleged female celebrities, Trotula, was none other than a man—one Trottus—and that Trotula passed long ago into the fairy tales as Dame Trot. Thus fades into nothingness, he says, the first woman professor whose life a learned medical historian, Salvatore De Renzi, once essayed to write in his Collectio Salernitana.

We have to thank Dr. Singer for a learned, amusing, and suggestive book, and one of special interest to medical men inasmuch as from our science most of the examples of evolutionary knowledge are taken. The illustrations are an interesting feature of the volume.

SOME PRINCIPLES OF DIAGNOSIS, PROGNOSIS AND TREATMENT.

A Trilogy. By ROBERT HUTCHISON, M.D., F.R.C.P., Physician to the London Hospital. Bristol: John Wright and Sons, Ltd. 1928. Pp. 54. 2*s*. 6*d*.

WHENEVER Dr. Robert Hutchison gives an address his audience may expect something interesting, witty and sound. This little book could be bought and read with profit by every specialist and general practitioner, young and old, in the land. In the specialist Dr. Hutchison's broad outlook should help to preserve a mental balance which is sometimes in danger; to the young general practitioner the practical principles he lays down are invaluable; while the older man will chuckle as he sees Dr. Hutchison put into pithy sentences the conclusions which he has himself arrived at by experience but has been unable to formulate. The book contains three addresses, two of which are reprinted from weekly medical journals, while the third is taken from the author's book on "The Elements of Medical Treatment."

In his preface Dr. Hutchison says that his object is to repeat and emphasise the elementary principles of diagnosis, prognosis, and treatment, which are in danger of being ignored through the rapid advances of modern medicine on the laboratory side. It is not that Dr. Hutchison despises modern methods, but he is anxious to show that medicine is and must remain an art, and that our duty is not finished when we have put an appropriate label on the symptoms. In diagnosis the author comments on the three faculties which are called into play—observation, knowledge, and judgment, and gives a list of "don'ts." Prognosis he characterises as the branch of medicine which has, perhaps, made least progress since the time of Hippocrates, and he discusses most admirably the vexed question of "What the patient should be told." Treatment is discussed under appropriate headings, and Dr. Hutchison emphasises the importance of paying attention to the patient's likes and dislikes, quoting Sydenham to the effect that "more importance is to be attached to the desires and feeling of the patient, provided that they are not excessive or dangerous, than to doubtful and fallacious rules of medical art."

CHILDBIRTH.

By WILLIAM GEORGE LEE, A.B., M.D. University of Chicago Press. 1928. Pp. 300. 15*s*.

THE manuscript of this book was completed just before the death of the author. It consists of the personal views of a leading American obstetrician not only on the theory and practice of obstetrics, but also on what he considers to be the ideal method of organising the maternity service of a country. Some of his ideas on organisation are excellent; others will receive little sympathy in this country. The following passage is hardly likely to represent current American or British opinion. "The midwife still persists to-day as an evolutionary remnant in our midst, although, like the vermiform appendix, she is now of concern chiefly because of the great amount of harm she originates, her essential functions

having long since been lost." The author possesses the power of explaining difficult points in the simplest language. Only 50 pages are devoted to normal labour, but the whole process could be readily understood by an intelligent lay reader; yet few experienced obstetricians would fail to derive benefit from reading the account. A long and careful survey is given of the reasons for interfering with the course of labour; under this heading are grouped such various conditions as hæmorrhage, contracted pelvis, and malpresentations. This is a mistake from the student's point of view, since the characteristic features of each of these abnormalities are not clearly set out. The procedures recommended are in the main orthodox, but the author's recommendation of uterine tamponade as a routine after manual removal of the placenta is unusual. Dr. Lee gives a full account of the Kjelland forceps; he considers this instrument the best for general purposes.

The book will be of interest mainly to those who already have a fair amount of experience in obstetrics.

GASTRO-INTESTINAL DISEASES.

Lectures delivered at the James Mackenzie Institute for Clinical Research. London: Humphrey Milford, Oxford University Press. 1928. Pp. 278. 10*s.* 6*d.*

THE collection of articles which form this volume consists of lectures delivered at the James Mackenzie Institute at St. Andrews during the winter session of 1927. Containing as it does the views of 11 eminent British authorities, together with discussion of their opinion by no less eminent critics, the volume is more than readable; it becomes practically a treatise on many unusual problems in connexion with the alimentary canal. We would call attention particularly to the article by Dr. E. Matthew on hæmatemesis, and that by Prof. D. P. D. Wilkie on gall-bladder disease as being models of what advanced lectures should be. The article by Prof. John Fraser on superficial pain as an aid in the differential diagnosis of abdominal disease is of the thoughtful and deeply informed nature which one is accustomed to expect from this authority.

The volume should receive a ready welcome from all practitioners whose interest in their profession is sufficient to persuade them not to neglect the use of books.

NEUROBIOLOGY.

Handbuch der biologischen Arbeitsmethoden. Edited by Geh. Med.-Rat. Prof. Dr. EMIL ABDERHALDEN. *Neurobiologische Studien am menschlichen Fœtus.* By M. MINKOWSKI, Zürich. *Methoden der Reflexprüfung beim Menschen.* By ARTHUR BÖHME, Bochum. Abt. V., Teil 5B, Heft 5. With illustrations. Berlin and Vienna: Urban and Schwarzenberg. 1928. Pp. 511–692. Mk.10.

Prof. Minkowski deals with a hitherto relatively unexplored field of neurophysiology, the material for the study of which is bound to be meagre and difficult to come by. Most if not all of it has been obtained by the help of colleagues, who have given him living fœtuses procured during Cæsarean operations. The viability of such organisms being dubious and in the majority of instances certainly brief, Prof. Minkowski has found it essential to form beforehand a clear idea of the exact experiments to be made and the time limits to be imposed for these, in each particular case; full details of his technique are supplied. Working along these lines, he has been able to cover a surprising amount of the field of antenatal neurophysiology. His experiments have been directed towards investigation of the origination of movements in the fœtus; whether at the earliest stages neuromuscular activity is possible without intervention of the central nervous system. Reflexes and reflex movements of all kinds are examined, including those studied by Magnus and de Kleijn; the special senses, too, are not omitted. The electrical excitability of the fœtal musculature receives attention. Prof. Minkowski divides fœtal life somewhat schematically into "phases" described as embryonic or neuromuscular, early fœtal or spinal, middle fœtal or tegmentospinal, and late fœtal or pallido-rubro-cerebello-tegmentospinal, respectively; his intention is to indicate, along the lines followed by Magnus, that at such and such an antenatal stage the fœtus is a "neuromuscular animal," a "spinal animal," and so forth. While this is doubtless correct enough in a physiological sense the discrimination is apt to lead to a rather artificial conception of neural activity. The monograph is peculiarly interesting and worth perusing by all those whose concern is with the nervous system.

Dr. Böhme's contribution is on clinical lines and deals comprehensively with reflexes in health and disease. In addition to those, both superficial and deep, with which the clinician has long been practically familiar, due attention is paid to the relatively novel reflexes and automatisms which in recent years have been elucidated by a number of workers, and which exhibit the activities of mechanisms at spinal and mesencephalic levels. The application of the researches of Magnus and de Kleijn to human pathological cases here receives full discussion and illustration. Altogether a very useful contribution to "reflexology."

RHEUMATIC DISEASES.

Being the Proceedings of a Conference on Rheumatic Diseases held at Bath on May 10th and 11th, 1928. Published by the Hot Mineral Baths Committee of the Bath City Council. Pp. 292. 5*s.*

THE proceedings at the important Conference on Rheumatic Diseases which was held at Bath under the presidency of Sir George Newman in May last were reported in these columns, several of the papers being published in full at the time or later. These proceedings have now been issued verbatim by the Hot Mineral Baths Committee of the Corporation of the City of Bath, and the volume forms a useful indication of the present state of our knowledge in regard to the incidence, causation, and treatment of many very common and obstinate pathological conditions. For convenience of reference the papers have been grouped under the headings of Social and General Aspects, Causation, and Treatment; a good index makes the record readily available for inquiry. On many important matters the papers show a diversity of opinion and consequently the need for further investigation, but along general lines the therapeutics represent the most recent work, and the book will be welcomed by medical practitioners as a help towards the elucidation of puzzling problems and a guide for routine treatment.

BOTANY.

A Practical Botany for Matriculation. By MARGARET A. SHUTTLEWORTH, Biology Mistress, Sydenham County Secondary School. London: University of London Press, Ltd. 1928. Pp. 272. 5*s.*

Miss Shuttleworth is already known as author of "The Wonders of the Human Body." Her aim has now been to supply a book, the subject matter of which will cover the matriculation syllabus in botany. It represents the minimum to be attempted in a two-years course and does not presuppose any previous course in nature study. In the experimental sections only the simplest apparatus has been described, pupils being encouraged to devise other methods of doing their practical work. The book is more than an examination manual, for it is interestingly written and excellently produced and illustrated. The author regards the relation between flowers and insects as the best basis for the study of the variety of flower forms, and the attention paid to pollination makes the manual of special interest.

HISTOLOGICAL TECHNIQUE.

A Guide for Use in a Laboratory Course in Histology. By B. F. KINGSBURY, Ph.D., M.D., and O. A. JOHANNSEN, Ph.D., Cornell University, Ithaca, N.Y. London: Chapman and Hall, Ltd.; New York: John Wiley and Sons, Inc. 1927. Pp. 142. 11*s*.

THIS book is designed as an introduction to laboratory methods and should prove of benefit to those who aspire to become laboratory assistants as well as to medical students. The authors, from their own experience, have made a conservative, and in many cases happy selection of the most applicable lines of procedure in histological investigations. Thus the inquirer is not faced with the problem of choosing from a bewildering number of alternative methods. Several notes on the difficulties commonly encountered in laboratory technique are given and a tabulated list of the causes of defects and difficulties in sectioning paraffin blocks should be of help to the beginner. Certain parts of the book may be criticised on the grounds that they are too sketchy to be of value, notably the section on the microscope and its accessories, which might well have been omitted. Figures depicting microscopes and accessories unaccompanied by descriptions are of little use.

HÆMATOLOGY OF CHILDHOOD.

Die Klinische Hämatologie des Kindesallers. By HEINRICH BAAR, Assistant at St. Anne's Hospital, Vienna; and EUGEN STRANSKY, General Assistant at the Imperial Institute for the Care of Mothers and Infants, Vienna. Leipzig and Vienna: Franz Deuticke. 1928. Pp. 481. 48*s*.

THIS work forms a useful pendant to the exhaustive monograph of A. Schittenhelm on blood diseases in general; pædiatricians and hæmatologists alike will find a great deal to interest them in these lucid pages. The hæmatology of childhood has quite legitimately been treated as a subject apart. It is regrettable that no two successive authors in this field can quite harmonise their nomenclature, but a liberal choice of synonyms is offered. An attractive feature is the full recognition of English-speaking authors in the excellent bibliography. The main sections of this work are on normal blood in childhood, the anæmias of childhood, "acute system-reactions," such as leukæmia, and the hæmorrhagic diatheses. A particularly valuable account of blood changes in infections of various types is included, and also clear discussions on the influence of faulty diet on the blood picture, and on the "anæmia pseudo-leucæmica infantum" and Banti's disease.

The book is likely to become a standard work of reference. In subsequent editions the illustrations might well be more ample, and the inferior photomicrographs omitted.

SURGICAL ANATOMY.

By GRANT MASSIE, M.B., M.S., F.R.C.S., Senior Demonstrator of Anatomy and Surgical Tutor, Guy's Hospital Medical School. London: J. and A. Churchill. 1928. Pp. 413. 15*s*.

IT is difficult to break new ground in a subject like surgical anatomy; difficult, too, to keep the size of a volume within bounds and yet to include all that the ordinary student should know. There is nothing very original about this book, but the author has achieved the more important parts of his task with some success. He has given us a book easy to read and not too long, and yet sufficiently full for the needs of the student up for his finals. He states in his preface that his object has been to present anatomical facts attractively, and this also he has done. The illustrations are simple, clear, and informative, and the book should be popular.

New Inventions.

INJECTION TREATMENT OF VARICOSE VEINS.

(1) A NEW SYRINGE FOR INJECTING SCLEROSING SOLUTIONS INTO VARICOSE VEINS.

As is well known, it is essential for a successful injection that the sclerosing solution should come in intimate contact with the inner coat of the varicose vein in order to injure the endothelium; this injury will be greater the more concentrated the injected solution. On the other hand, it is necessary to make

sure that the lumen of the vein has been entered, and this is done by aspirating some blood; the blood thus drawn into the syringe is apt to reduce the concentration of the sclerosing solution. It is therefore essential to aspirate as little blood as possible, and a syringe which allows the smallest quantity of blood to be clearly detected is indicated. I have used such a syringe for the last six months with most gratifying results. The essential part of it is the long fine nozzle made of polished glass, magnifying the extremely fine lumen. An infinitely small amount of blood is readily observed, which could not cause any dilution of the sclerosing liquid; a fine short bevelled needle is used with the syringe.

Messrs. Charles King, 34, Devonshire-street, London, are the manufacturers.

Harley-street, W. A. A. MILLER.

(2) NEEDLE FOR THE INJECTION TREATMENT OF VARICOSE VEINS.

THE needle here illustrated allows the syringe to be detached without causing undesirable effects while the patient is changing from the standing to the supine position, the prevention of loss of blood and of air entering the vein. Through the body of the

needle head there is a hole into which a loosely fitting stop-cock is fitted. The stop-cock is "open" when the cross-bar is in line with the long axis of the needle. The stop-cock is fitted with a No. 17 needle, one inch in length. In use, the needle, attached to the syringe, is inserted into the vein while the patient is standing. The syringe is then detached allowing blood to flow from the needle and then the tap is closed by a quarter turn of the cross-bar. The patient then lies down and the needle will remain undisturbed in the vein. The limb is somewhat elevated and the nozzle of the syringe lightly approximated to the head of the needle, the cavity of which is gently filled with the fluid to be injected, so as to expel the air from it; the syringe is then firmly attached, the tap opened, and the injection made.

The needle is manufactured by Messrs. Allen and Hanburys, Ltd., Wigmore-street, London.

H. ARTHUR MURRAY, M.B., Ch.B. Edin.,
M.O., Colonial Medical Service (Basutoland).

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 1, 1928.

INOCULATION AGAINST ENTERIC FEVERS.

THE paratyphoid outbreaks have put many problems before practitioners in the affected districts. Among the more important of these are the recognition of the disease in those who are unwell, and the possibility of preventing infection of the healthy inhabitants. Certain diagnosis of the enteric fevers in doubtful cases owes more to the laboratory than does that of any other group of diseases, since at different stages of the disease either agglutination tests or microscopic examination of blood, urine, and fæces can be relied on to reveal infection. It is therefore appropriate that the first of our new series of articles on the Clinical Interpretation of Aids to Diagnosis should deal with the topical subject of agglutination tests in enteric fevers, and we draw special attention to the detailed advice offered by Dr. A. B. ROSHER as to the best methods of collection and despatch of specimens of blood. The diagnosis being established, the house-mates of the patient are more than likely to demand advice as to means of protection since they have realised how extremely uncomfortable an attack of paratyphoid fever may be. It is, therefore, worth while to consider the dosage and nature of the vaccine which may be employed for protective purposes.

The success of anti-typhoid-paratyphoid (T.A.B.) vaccine during the late war is familiar to everyone, and this preparation has been accepted as a convenient means of safeguarding persons likely to be exposed to the enteric group of diseases. The army vaccine was made up to a strength of 1000 million killed organisms per cubic centimetre—comprising 500 million typhoid bacilli, 250 million paratyphoid A, and 250 million paratyphoid B. Half a cubic centimetre (or 500 million organisms in all) was given as the first dose, after which 10 days were allowed to elapse before giving the second dose of 1 c.cm. (1000 million mixed organisms). These quantities undoubtedly produced a high degree of immunity, and there is certainly no reason for exceeding them in civil practice, as is sometimes recommended. On the contrary, it should be remembered that these two doses of 500 and 1000 mixed organisms were intended for healthy men in excellent physical condition. They are probably too great for the average male civilian and undoubtedly excessive for women. In prophylaxis by vaccines the ideal is a gradual rise of immunity unaccompanied by unpleasant "reactions." Military life makes a long series of injections inconvenient, because this would mean keeping the troops under observation for a considerable time; the number of doses is, therefore, reduced to two. Similarly, there may be reasons in civil life why the resistance should be raised immediately rather than at leisure—e.g., the presence of an epidemic—but it is wrong to suppose that two large doses producing two strong reactions at a week or ten days' interval is the only means of securing immunity. When there is plenty of time before exposure to infection there is no reason why a feverish reaction should not be avoided altogether by starting with quite small doses—even as little as 10 millions at first—and gradually building up the patient's powers of resistance. The immunity thus induced would probably be stronger than that obtained from two large injections. No vaccines are calculated to save a person who incurs successive infection by large quantities of virulent organisms; to ask this is to ask too much. If enormous doses of enteric bacilli are taken, as sometimes happens, for example, among mental patients of unclean habits, even recent immunisation might not actually stave off the disease, though it would probably prevent its being fatal. The usual aim of prophylaxis is to arm us against small accidental contaminations of food, and it need be effective no longer than there is danger of these occurrences. Immunity is a purely relative term, but, judging by agglutination tests, that conferred by paratyphoid A vaccine in ordinary dosage tends to disappear after about a year: typhoid immunity may possibly last three years, whilst paratyphoid B occupies an intermediate position. In civil life relatively small amounts of vaccine—e.g., three doses of 100 millions, 200 millions, and 500 millions respectively might be tried with advantage. Probably these are somewhere near the minimal quantities for securing rapid immunity to moderate infection in a male adult. If immediate protection by a single dose is wanted 500 million T.A.B. organisms should prove sufficient for practical purposes, and half this amount can give a considerable reaction. Inoculation is believed to be followed by a "negative phase" in which the subject's resistance is somewhat lowered, and this might be regarded as endangering individuals who are given typhoid vaccine whilst exposed to infection. It is hard to say when this phase begins and ends, but its significance has probably been much exaggerated. It is said to come on shortly after the organisms have been administered and to cease as the febrile symptoms abate. The negative phase affords no good reason for abstaining from inoculation. Nor are there many other reasons provided that the dosage chosen is not too large. In estimating the quantities to be given to children a calculation may be made on the basis of body-weight, though this does not hold good for very small children; when in doubt it is better to give less rather than more than the calculated amount. Apart from this it is enough to say that alcoholics react rather strongly; that renal disease requires especial caution; and that care and judgment are naturally needed where patients are enfeebled by disease or any other cause.

At the beginning of the late war it was found that soldiers inoculated with pure typhoid vaccine readily contracted the paratyphoid fevers. This shows that the killed typhoid organism confers a specific immunity, being powerless to protect the patient against others of the enteric tribe; so the typhoid element in T.A.B. does not appreciably reinforce the action of the A and B elements. As paratyphoid A is almost unknown in this country, and typhoid is not a serious risk in most localities, it would be sufficient in face of a paratyphoid B outbreak to give a pure *paratyphosus* B vaccine. The total number

of organisms given can thus be greatly reduced and the reaction—sometimes far from negligible—should also be diminished, though not perhaps in arithmetical proportion. To give the full anti-typhoid-paratyphoid vaccine for fear of a paratyphoid epidemic is like insuring against accidents by all means of transport when about to travel by aeroplane. Large doses of T.A.B., as now given with some freedom, are not likely to make inoculation popular, and it seems worth while to point out that they are seldom necessary.

THE LEGAL LIABILITY OF HOSPITALS.

IF a patient has some grave cause of complaint over the treatment he has received in hospital, it must surprise him to find how difficult it is to make the hospital liable in law for the actions of its expert staff. He may never have heard of the legal maxim *respondeat superior*, but he will know of frequent cases where an employer has been made to answer in damages for an employee's wrongful acts towards third parties. He will probably think of hospital and doctor as master and servant, for he will have an idea that the hospital exercises control over its expert staff by paying their salaries and by wielding the power of appointment and dismissal. But he will be wrong. These may be elements of the relationship between master and servant but—as Captain J. E. STONE makes clear in the careful analysis of the legal position which is concluded in our columns this week—these elements are not enough. The physician or surgeon on the staff of a hospital is nobody's servant. The hospital does not interfere with the prescriptions of the one or the operations of the other. The hospital's duty is to select a competent staff; it does not insure that the experts so selected will use that degree of care and skill which persons competent in that sphere may be expected to use. This limitation upon the doctrine of *respondeat superior* is by no means confined to the medical profession, but it happens to have been affirmed in three cases in which medical treatment was in question.

In the first of these (Hall *v.* Lees, 1904) a plaintiff complained that she had been injured by the negligence of a nurse provided by the defendants who were an association existing to supply duly qualified nurses. It was held that the association only undertook to supply a competent nurse for the patient, not to nurse the patient; the nurses had to follow the directions of the patient's doctor and the association was not responsible if a nurse failed to exercise due care and skill. Two years later, in Evans *v.* Liverpool Corporation, a jury found that the plaintiff's son had been discharged too soon from an infectious diseases hospital provided by the defendant corporation. He was sent home before he was completely recovered from scarlet fever, and consequently his brother and sisters were infected. Mr. Justice WALTON held the defendants not liable. "They do not undertake the duties of medical men or to give medical advice, but they do undertake that the patients in their hospitals shall have competent medical advice and assistance." The doctor in charge was admittedly competent and so no blame attached to the corporation for employing him. Finally, in Hillyer *v.* St. Bartholomew's Hospital the Court of Appeal put the matter beyond doubt in 1909. A patient somehow received burns while under an anæsthetic on the operating table; he sued the hospital but his claim failed. Lord Justice FARWELL said it was impossible to contend that the surgeon or the acting assistant surgeon, or the house surgeon, or the anæsthetist were servants of the hospital in the proper sense of the word. They were all professional men employed by the hospital to exercise their profession to the best of their abilities according to their own discretion; in exercising it they were in no way under the orders of the hospital or bound to obey its directions. A similar principle applied to the nurses. "The nurses and carriers assisting at an operation cease for the time being to be the servants of the defendants (the hospital), inasmuch as they take their orders during that period from the operating surgeon alone."

As Captain STONE is careful to point out, Lord Justice KENNEDY, while concurring in the court's decision, added a qualification. "It may well be," he remarked, "that the hospital authority is legally responsible to the patients for the due performance by their servants within the hospital of their purely ministerial or administrative duties, such as, for example, attendances of nurses in the wards, summoning of medical aid in emergency, the supply of proper food, and the like." Hospitals, therefore, it appears, must distinguish between the matters of professional skill in which the hospital board will not interfere with physician, surgeon, or nurse, and the "purely ministerial or administrative duties" which the board is responsible for regulating. Presumably it would be for the jury to apply the distinction to the facts of a particular case. But a jury could hardly decide without giving due weight to the evidence of the medical profession on what would be largely a matter of professional practice. The same remark applies to those occasions where there is a question of the relative responsibility of nurse and medical practitioner as in a recent case where a patient was scalded by a hot-water bottle. If the profession can achieve unanimity in its evidence regarding the particular functions delegated by physicians or surgeons to nurses, the court and the jury are not likely to take a different view.

DENGUE IN ATHENS.

AN epidemic described as dengue fever has attacked the inhabitants of Athens and the Piræus during the last few days. The number of cases is reported to be between 160,000 and 200,000. All business is paralysed and many shops, offices, and factories have had to close down owing to the illness of their staffs. The leading bank, with a normal staff of 180, is now carrying on with only 20, while Government departments are quite disorganised. The epidemic is now spreading to the provinces, whither Athenians have fled to avoid contagion.

Dengue fever is best known as an endemic infection in the coastal regions of India, China, the East Indies, and throughout the Pacific islands. Many widespread epidemics have been recorded since MANSON first described the virulent outbreak in Amoy in 1872, which completely paralysed the small European population of the town and attacked 95 per cent. of the Chinese population. The exact method of conveyance of the disease was at that time unsuspected; but MANSON recorded with characteristic fidelity the sudden onset, the excruciating bone pains which have bestowed the synonym of "dandy" or "breakbone fever" on the affection. Other peculiar features—the double crisis of fever, the purpuric rash, and the post-febrile bradycardia—were also noticed in the Amoy cases. To show the sudden onset of symptoms it is recorded that victims attacked

while shaving would drop a razor to the ground from a helpless hand. Since that period dengue has occurred at intervals of years in epidemic waves, mainly in the early autumn months. In Europe it has appeared in Southern Spain, Gibraltar, Malta, Turkey, and, notably in 1881, in the Ægean Islands. In Asia Minor serious epidemics have occurred in Smyrna, Cyprus, Beirut, Jaffa, and Jerusalem. While normally a coastal disease, in its pandemic form dengue spreads a considerable distance beyond its usual confines and may even, in Syria, ascend mountains to a height of 5000 feet. That the disease is spread solely by the agency of mosquitoes has been recognised since the original observations of H. GRAHAM in Beirut in 1903. At that time he suspected that the carrier was the common brown mosquito *Culex fatigans*, though since then the carefully conducted experiments of CLELAND, BRADLEY, and MCDONALD, in Australia, have incriminated the common "tiger mosquito," *Aëdes argenteus* (formerly known as *Stegomyia fasciata*) as the sole vector. The exact nature of the dengue virus is unknown, but the researches of CLELAND and his fellow workers have shown conclusively that the virus is attached or agglutinated to the red blood corpuscles and can pass through the pores of a Pasteur-Chamberland filter. J. F. SILER has demonstrated that the blood in dengue is infective to the mosquito for 18 hours before the onset to the end of the third day of the illness. The mosquito, after imbibing dengue blood, does not become infective for 11 to 14 days, but thereafter remains so for the rest of its life.

For the development of an epidemic the vector must be present in large numbers, and this implies defective sanitation and abundant opportunities, in the supply of stored water in close proximity to the houses, for the mosquito to breed; in short, the conditions which favour the spread of dengue are similar to those conducive to yellow fever. At the present moment conditions in Athens must be unusually favourable to the propagation of *Aëdes argenteus*. As regards potential disability during an attack dengue is serious enough, but as a rule it leaves no permanent serious sequelæ in its wake, and the mortality-rate is very low. Perhaps it is for this reason that no specific pathological lesions, gross or microscopic, have been discovered. Unfortunately the present epidemic at Athens appears to be exceptional in having a high mortality-rate, the attacks being often fatal. Probably, however, the infection is killing only those who are the subjects of grave heart or kidney disorders, where it acts as the immediate cause of death. If dengue is the sole cause it must be of an unprecedented virulence. Another possibility is that the epidemic may be due to some other infection. If it is dengue there is no prospect of abatement until the advent of the cool weather, which cannot be expected for another two months.

POST-VACCINAL ENCEPHALITIS.—The Small-pox and Vaccination Committee of the Health Committee of the League of Nations met at Geneva on August 22nd under the presidency of Dr. R. Jorge, of Portugal, to consider this among other questions. A report has been drawn up in which the rarity of these cases is emphasised, in comparison with the total number of vaccinations in any country. The committee points out that children between 3 and 13 years of age are particularly susceptible, whereas infants and adults are hardly ever affected; this age incidence suggests the inadvisability of postponing primary vaccination, which is the most powerful weapon available against small-pox, until after infancy. The appearance of encephalitis is not held to be associated with any particular strains of lymph or with accidents in preparation. The committee conclude, on the evidence available, that post-vaccinal encephalitis is distinct from encephalitis lethargica.

Annotations.

"No quid nimis."

THE COPENHAGEN CONGRESS.

THE First International Congress of Oto-Rhino-Laryngology, which was held at Copenhagen at the opening of last month under the presidency of Prof. E. Schmiegelow, was fully attended. The meetings were held in the Christiansborg, the Danish Houses of Parliament, and the opening ceremony was honoured by the presence of the King of Denmark. The amount of material was so great that the Danes generously forwent the reading of their papers. There were four main subjects for discussion: (1) Septicæmia as a result of pharyngeal infection, opened by Prof. W. Uffenorde (Marburg) and G. Ferreri (Rome), the opening with excellent lantern slides showing invasion of vessels in the neck by organisms. (2) The conservative radical operation, by Prof. H. B. Neumann (Vienna), well illustrated by slides of microscopical sections to show bony changes going on in apparently healed radical operations. Mr. H. Barnett (Bath) followed, condemning the radical operation. Considerable discussion took place, but nothing really new emerged. (3) The influence of anatomical structure of the middle ear on the course of suppuration therein by Profs. F. J. Moure and G. Portmann (Bordeaux) and by Prof. K. Wittmaack (Hamburg). This is a subject on which otologists in this country have long held definite opinions, led by Mr. A. H. Cheatle. (4) Surgical diathermy for cancer of the pharynx, larynx, and œsophagus, opened by Dr. Dan McKenzie, followed by Mr. Norman Patterson (London); a strong case was made out for removal of growths by the diathermy knife instead of the cold knife. In the subsequent discussion papers were given by French and Spanish authors. The shorter papers read at the Congress dealt with practically every branch of the specialty. To mention one or two that were outstanding: Dr. A. Pohlman (St. Louis, U.S.A.) spoke on "minimal audition"; experiments on this subject had been made with an audiometer and many interesting observations emerged, notably that lengthened bone conduction is apparently not real. This property was, however, vigorously sponsored by clinical observers of the German school. It seems that the audiometer has not been given enough attention in this country. Dr. Wells Eagleton's (Newark, U.S.A.) study of sixth nerve involvement in connexion with the early diagnosis of meningitis called forth some interesting discussion. Dr. E. Huizinga and Dr. C. E. Benjamins (Groningen) brought forward some interesting work on ablation of parts of the internal ear in pigeons; they found that destruction of the lower part, including the saccule, produces no demonstrable effect on the movements of the birds; while ablation of the superior part containing the utricle and three ampullæ has the same result as complete destruction of the labyrinth. Mr. V. E. Negus (London) put forward in his paper the ingenious suggestion that the function of the cricopharyngeus sphincter was to prevent air passing into the œsophagus during inspiration. In addition to the scientific work there was much entertainment offered by the President, the Committee, and the civic authorities, and Dr. N. Rh. Blegvad deserves a special word of mention for his all-embracing labour as general secretary.

PINEAPPLE JUICE.

CHILDREN have always preferred the raw pineapple, when obtainable and however crude, to the uniform and refined product in sealed tins; and their choice is wise, for, as the *Journal* of the American Association has reminded us again, fresh pineapple juice contains an active proteolytic enzyme known as

bromelin, which is destroyed when the juice is heated or the fruit is canned. No doubt both clauses are true when canning implies heat; but our own chemist pointed out a quarter of a century ago that, while the peculiar digestive agent of pineapple is destroyed by cooking, there is no reason why tinned fruit should not retain its digestive power, provided that the pineapple is not preserved by heat. Bromelin, as we then showed, would digest as much as 1000 times its weight of protein, whether of meat or eggs, within a few hours, and there is an abundant supply of the enzyme in the pineapple for the average sized pine will yield nearly two pints of juice. Unlike pepsin, the digestive principle of the pine appears to operate equally well in an acid, neutral or alkaline medium. There would therefore be more justification for eating pineapple and beefsteak together than there is in eating red currant jelly with roast mutton, although we may reasonably assume in the latter case that it was because an enzyme accompanied the pleasant taste that this culinary constellation arose and retained its sway. Bromelin must not, of course, be confused with bromalin, a combination of hexamine and ethyl bromide which has had some vogue in neurasthenia and epilepsy. It is curious that Remington's Practice of Pharmacy, which is such a complete collection of drug lore in America, contains no mention of this pineapple enzyme, although it is mentioned in Tibbles's Foods and is well recognised so far afield as in Mayerhofer and Pirquet's Lexikon, and in Nadkarni's Indian Materia Medica.

THE LATE INFECTIVITY OF SCARLET FEVER.

IT used to be thought that after about six weeks, and the completion of desquamation, the scarlet fever patient was free from infection. Later it came to be noted that after the discharge of scarlet fever patients from hospital a fresh infection occasionally arose in the home. For example, in 1894 Dr. A. K. Chalmers reported that among 2593 patients discharged from the infectious hospitals in Glasgow fresh cases appeared in 70 of the houses to which they were sent. An investigation set up by the Metropolitan Asylums Board culminated in a lengthy and valuable report [1] by the late Dr. A. G. R. Cameron in 1904. In this report he emphasised—what was already known to many—that it was the convalescent with unhealthy mucous membranes who was more likely to be infectious and that there was no evidence of infection arising from late desquamation. Of late years there has arisen a tendency to curtail the detention period of this disease. In his report [2] to the Ministry of Health Dr. Allan C. Parsons gives information concerning the minimum period of detention of uncomplicated cases in 46 hospitals. The authorities of 15 of these required 42 days detention as the minimum, one 40 days, three 35 to 42 days, six 35 days, one 30 days, eighteen 28 days, and two 21 days. Thus it will be seen that 25 observers do not differ much from the old dictum. There is little doubt that a number of sufferers from scarlet fever are free from infection at the end of four weeks and probably earlier, and if diphtheria can be taken as an analogy it is certainly so, but the difficulty is in picking out those who are free from infection from those who are not. It is admittedly unsafe to consider free from infection those who suffer from a pathological condition of the throat or of the nose, or those who may have an unhealthy condition of an ear. But it is not always easy to decide that the tonsils are quite normal, and it may be quite impossible to discover a tiny nidus of infection in the small nasal passages of a young child. It may be said that this is also so at a later stage of the disease, but it is to be remembered that the natural tendency of the human being is to rid himself of infection and therefore the risk in early discharge is greater. In detecting infection in similar cases of diphtheria careful bacteriological examination is of some help, but this can hardly be said of scarlet fever, for it is difficult to differentiate the streptococcus of this disease from other hæmolytic streptococci. On the whole, therefore, and admitting our want of precise knowledge, it may be considered wise to regard scarlet fever patients who show no pathological condition of the throat, nose, or ear as possibly infectious for a period of about five or six weeks after the onset of the disease. There is ample evidence that the late desquamation is not in itself infectious, and there is no definite evidence that the earlier desquamation is capable of causing infection to others. On the other hand, patients suffering from pathological conditions of the nose or throat should not be considered free from infection until recovery from them has taken place. A discharge from the ear does not appear to be so fruitful of infection, and consequently some observers consider it comparatively safe to discharge such cases at the end of three months. It is easy, even for the experienced, to fail to observe some small unhealthy area of the mucous membrane, and it should always be borne in mind before declaring a patient to be free from infection that a most careful examination should be made.

[1] Report on Return Cases of Scarlet Fever and Diphtheria between July, 1901, and July, 1902.
[2] Some Administrative Aspects of Scarlet Fever ,1927.

ALUM IN BAKING POWDERS.

FOOD prepared by modern methods frequently contains small quantities of constituents, the presence of which is not suspected either by the consumer or his physician, and which by their long-continued action may set up symptoms which are distressing to the one and puzzling to the other. Five workers at the Institute of Physiology of the University of Strasbourg [1] have investigated the effects of "mineral leavens" or baking powders containing alum; a matter which is not new, but which, having regard to the very different views held in Europe and America, fully justified reinvestigation more especially as the Strasbourg workers, as they point out, have considered the physiology rather than the gross toxicology of the question. They say "we would like to show by a precise example to what social dangers we are exposed through the daily use of products which have no justification from the physiological point of view, but only mean a slight economy of time to cooks and housekeepers." This way of looking at things may well be commended to those who would suffer the addition of boric acid to food.

The American tolerance of alum in baking powders, which the health authorities of most European countries virtually forbid—even in blockaded Germany when potassium bitartrate could not be procured, "hygienists" we are told, "severely opposed themselves to the production or sale of mineral leavens containing alum, even as an *ersatz*"—is due to the belief that if the powder is a scientifically calculated mixture of acid calcium phosphate, alum, and bicarbonate of soda, all that remains in the bread when the reaction is finished will be sodium sulphate, acid sodium phosphate, calcium carbonate, and aluminium phosphate. The insolubility of the last substance is apparently assumed. As a matter of fact, although the Strasbourg workers do not refer to it, W. D. Bigelow and C. C. Hamilton in 1894 [2] concluded that the influence of alum in flour on digestion was overestimated, but that, notwithstanding statements as to its insolubility, aluminium phosphate had a retarding effect on gastric and pancreatic digestion in vitro, while two years earlier O. Hehner had shown by experiments on himself and two assistants that baking powder containing alum when taken alone caused diarrhœa and painful indigestion. Comparative experiments on mice have shown Schaeffer that bread containing aluminium phosphate gives rise to a

[1] The Dangers of Certain Mineral Baking Powders Based on Alum, when Used for Human Nutrition. By Georges Schaeffer, G. Fontes, E. Le Breton, Ch. Oberling, and L Thivolle. Journal of Hygiene, August, 1928.
[2] Jour. Amer. Chem. Soc., xvi., 587–597.

paracellular necrosis of the superficial epithelium of the stomach and of the tops of certain intestinal villi, these lesions greatly resembling erosions found in human pathology. When dogs are fed with similar aluminous bread lesions are not formed in either stomach or small intestine, but in the large intestine, and especially in the descending colon and the sigmoid flexure. Further, there seems to be a specific action of the aluminium ion on the ovary, as the productivity of female mice is much diminished if they are fed on the aluminious diet, and the offspring succumb more easily to infantile disease. Anatomo-pathological examination confirms these experimental results in a striking manner. While in the case of male mice having absorbed aluminium the testicles remain normal and the spermatogenesis active, the female mice show characteristic lesions of the ovaries.

The Strasbourg chemists' concluding paragraph is well worth reproducing: "We hope," they write, "that this summary of our researches will be sufficient to make clear the nature of the danger spoken of at the beginning of this article. We see that certain bodies, not poisons in themselves in the usual sense of the word, can provoke physiological disorders and organic lesions, the ætiology of which remains generally unnoticed, when they are absorbed daily for months and years. Such products are most certainly responsible for many illnesses, the frequence of which augments with the alimentary conditions imposed on us by modern civilisation in a manner inexplicable beforehand. Our object will have been attained if we succeed in attracting the attention of physicians and hygienists to certain problems, the study of which is perhaps not very attractive, but the solution of which is of considerable practical interest."

THE MEDICAL RELATIONS OF LAFONTAINE.

THE author of the celebrated "Fables" was by no means an admirer of the medical practice of his time, yet he associated on friendly terms with quite a number of physicians, some of whom were distinguished in their day. On the mother's side he was descended from two royal physicians, and he had two maternal uncles who practised medicine. Yet, as Dr. George Morin writes,[1] he does not seem to have inherited any therapeutic instincts from his medical forbears. His mother was Françoise Pidoux, whose family was well-to-do and important in Poitou for many years. The great-grandfather of the poet was François Pidoux, who received his diploma of Doctor at Montpellier, and settled in Poitiers instead of his native town of Châtellerault, became the doyen of the medical faculty of Poitiers, and waged war against charlatans of all sorts, of which Poitou was always a happy hunting-ground. He also insisted on the application of the edict of Blois which prohibited the sale of medicines by druggists, except on medical prescription. This was in 1541—so long has been the struggle against counter prescribing! François Pidoux was called in to treat important personages and at length was appointed first physician to King Henry II. He died in 1600, leaving the family of Pidoux among the most influential in all Aquitaine. His second son, John, following in his footsteps, studied under his father in Poitiers and became personal physician to the Duke of Anjou, afterwards Henry III. of France, whom he accompanied on an expedition to Poland, on which occasion he proved useful to the father of Cardinal Richelieu and secured his favour. On the accession of Henry IV. he became also his physician. Jean Pidoux was the author of the first book in French on hydrotherapy and balneology. He published, in 1587, a treatise on "La vertu et usage des fontaines de Pougues en Nivernais et discours qui peut servir aux fontaines de Spa et autres de pareil goût." Not content with his doctorate of Poitiers he obtained 20 years later the similar degree at Paris. His inaugural thesis was entitled De Febrium Curatione. He lived in influential and literary society in Paris and was employed in various important political and social affairs connected with the Court. His ambition to shine as an author of verse was not gratified, for his efforts, says Dr. Morin, are not worthy of the grandfather of the author of the fables. If Lafontaine inherited from the Pidoux no aptitude for the practice of physic, he seems at least to have received through his mother their love of good cheer and of good company and their capacity for enjoyment. He describes in a letter to his wife a visit to one of the Pidoux of Châtellerault, a kindred spirit who at the age of 80 was full of the joy of life. Dr. Morin concludes by deciding that Lafontaine was a regular Pidoux, a Pidoux full of life and spirit, imaginative, light-hearted, and frivolous.

[1] L'hérédite médicale de Lafontaine, Paris Médical, July 21st, 1928.

A NEW ANTHELMINTIC.

THE search for a vermicide harmless to man continues. Dr. J. Chevalier[1] brings forward the claims of two pyrethrines obtained from *Chrysanthemum cinerariaefolium*, the insecticidal pyrethrum, and isolated by fractional distillation in vacuo. They are non-crystalline, insoluble in water, but easily dissolved in organic solvents, and can readily be rendered almost inert by saponification. It has been found impossible to kill warm-blooded animals by oral ingestion or by subcutaneous injection of these substances, though intravenous injection at the rate of 2 mg. per kg. of body-weight produces clonic convulsions, and 6 mg. is fatal. On the other hand, cold-blooded animals such as fish, leeches, earthworms, and frogs die in dilutions of from 1 in 1,000,000 to 1 in 3,000,000. Classing intestinal worms as akin to cold-blooded animals, Chevalier found experimentally that *Ascaris lumbricoides* of the pig and tænias of the dog became detached and convulsive, and presently died when placed in a "dilute" solution of the drug. Experiments in the treatment of animals are reported as successful, and excellent results are said to have followed its use in human beings infected by various worms and by giardia; the drug is also being tested on the hookworm in Egypt. Detailed reports of the dosage used and of the grounds on which these conclusions have been reached will be awaited with interest, seeing that the preliminary note is silent on these essential matters.

[1] Bull. de l'Acad. de Méd., 1928, xcix., 446.

THE LATE SEQUELÆ OF EPIDEMIC ENCEPHALITIS.

THE serious prognosis of the later manifestations of epidemic encephalitis, to which we drew attention in a leading article on June 30th, is confirmed by the studies of Dr. Lloyd H. Ziegler, published in the *Journal of the American Medical Association* of July 21st. Working from the Mayo Clinic he has followed up 752 patients who had attended the clinic for epidemic encephalitis during the period 1918 to 1927. The mortality-rate for this group was low at 13·2 per cent., but on the other hand the complete recovery-rate was only 1·3 per cent.; of the total number of patients 15·7 per cent. were able to work regularly, and 25·7 per cent. were able to do light or part-time work. Unfortunately there is little doubt that the work figures for the same group of patients will diminish in time, owing to the fact that the condition usually progresses slowly, and many of the patients in the series only had their attack within the past four years. Half of them developed chronic sequelæ immediately after the acute attack; nearly 10 per cent. recovered entirely from their acute attack, only to develop chronic sequelæ 15 (average) months later, and in one case the latent period was actually seven years. Fully a quarter of the patients exhibited a residual stage practically indistinguishable from post-influenzal debility for 14 (average) months before

sequelæ emerged, and no fewer than 15 per cent. of these patients are now Parkinsonians. The mental aspect does not appear to have received the same careful attention as the neurological in this investigation, only very obvious symptoms being recorded. There seems little doubt that when the encephalitic temperament is more generally recognised it will be appreciated that the chronic invalidism of the encephalitic is due as much to mental as to physical disabilities. The lowering of emotional values, the craving for sympathy and attention with exaggeration of physical deficiencies, and the childish outlook and lack of concentration of the average encephalitic are often more important factors in the economic question of ability for self-support than are the tremors, mild rigidity, ocular symptoms, and other neurological manifestations. The futility of our present methods of treatment of this disease is brought out by Dr. Ziegler's study. All the recognised methods were tried in this series of cases, and apart from the undoubted value of scopolamine as a palliative measure in Parkinsonism no therapy can be regarded as of any appreciable value. At the Mayo Clinic sodium cacodylate is regarded as a useful tonic, and supplemented by good general care and attention to obviously active foci of infection forms the usual method of treatment. Streptococcal vaccines, autogenous or prepared from patients with similar disorders, have been extensively used at this clinic, but the results obtained were no better than with other therapeutic measures. It appears that the most hopeful sign in the realm of this disabling disease is the steady diminution in the number of fresh cases which has occurred in each succeeding year since the severe epidemic of 1924.

LOCAL MALARIA CONTROL IN BENGAL.

Birnagar or Ula, credited with being the place whence spread the disastrous malaria epidemic of 1856, is one of those half derelict towns so frequent in the upper Gangetic delta, with a population of 2300 in place of the 40,000 of 70 years ago before malaria, speaking without metaphor, laid it waste. Five years ago some inhabitants, stung by the position, formed a local public health society, whose keen honorary secretary has just issued one of his periodical reports.[1] Funds are supplied by considerable private subscriptions, by a substantial grant from the Bengal Government, and by a large gift of quinine from its director of public health. The antimalarial measures used have been the oiling of anopheline breeding-places and a wide administration of quinine. The difficulties encountered in this private enterprise have been those familiar when such campaigns have been attempted in India by Government officers. There has been some stubborn opposition to oiling, two and a half out of eight and a half miles of water edge in the small area actually covered having had to be left unprotected. These untreated tanks have bred larvæ profusely, and it is significant that while the municipal authority has contributed generously to the funds of the society, the municipal tank is not one of those which the society has been permitted to oil. Some of the observations made have a wide applicability. The washing of muddy water into tanks was followed by destruction of all larvæ, breeding recommencing immediately as it settled and cleared. While, apart from this, mosquitoes bred continuously they did not torment human beings during dry weather, but as soon as rain fell entered houses and bit, while the malaria-rate rose after the usual interval. It is believed that in dry weather the insects remained inactive in the all-embracing jungle, and that this is also the explanation of the immediate but temporary influx of mosquitoes into houses when neighbouring jungle is felled. Such clearance has been begun with sale of wood and cultivation of land, but permission for further clearance is being withheld by owners. The future is not looked forward to with hope. It is felt that the determination of the mosquito species most implicated locally in transmitting malaria requires more expert knowledge than is available on the spot, but it is, after all, improbable that the ungrudging coöperation of the Bengal Malaria Research Laboratory, already afforded in identifying larvæ, will not be extended to the dissection of mosquitoes locally collected, a subject particularly appropriate. It is believed, too, that the local campaign should be merged in a wider one to be undertaken, the writer suggests, by the District Board. If certain indications in the report are read aright it is questionable whether anything will replace adequately an enthusiastic local patriotism.

[1] Malaria Control in Birnagar, 1927. By Krishnasckhar Bose.

CHEMISTS AND BENZOL.

WE owe to research in America, originated in industry,[1] the disclosure that benzol possesses definite toxic properties. When its fumes are regularly inhaled in a strength of 100 parts per 1,000,000 of air the hæmopoietic organs are attacked, and anæmia follows with decrease of polymorphonuclear leucocytes. Industrially benzol is used as a valuable solvent, particularly of rubber. Fortunately less toxic solvents, such as toluol, xylol, or high flash naphtha, can be substituted, and it has never come into widespread use in English factories. Now a useful note [2] of warning is given to chemists working in laboratories, who are notoriously careless about exposing themselves to unnecessary risks. They are urged to confine the use of benzol to testing, and to abolish it as a cleansing agent for which it is far too often used in profusion. If for any reason continued exposure is unavoidable, the chemist should place himself under medical examination once every month or two. Chemists tend to disregard the fact that the human body is a delicate reagent always ready to react when exposed to unsatisfied compounds, of which benzol is one.

[1] Greenburg, Leonard: Benzol Poisoning as an Industrial Hazard. Public Health Reports, Washington. July 2nd, 9th, and 23rd, 1926.

[2] Bloomfield, J. J.: Benzol Poisoning as a Possible Hazard in Chemical Laboratories. Public Health Report, Washington. July 20th, 1928.

THE PHYSIOLOGY OF FASTING.

MANY religions exhort believers to fast for the good of their souls, and most unqualified and some qualified schools of medical thought advocate occasional fasting for the good of the body. There is no doubt that some degree of reduction in the diet produces excellent results in a great many persons, but there is much uncertainty about the mechanism by which these results are produced. Prof. P. F. Richter holds the view that for lack of knowledge of the physiology of hunger a valuable therapeutic weapon is being neglected. In a recent address[3] to the Berlin Society for the Study of Internal Medicine he dealt exhaustively with hunger from the clinical point of view. Its syndrome is, he says, primarily a defence mechanism. Deprived of a part of its supplies, the organism promptly adapts itself for work on a restricted intake. It reduces its combustion rate and institutes economy in all its departments. By lessening the pangs of hunger it enables itself to endure the new conditions as long as possible. Fasting is, therefore, an effective means of lowering the metabolic rate at need. One of the most important fields for its use is diabetes, and research into the biochemistry of hunger would almost certainly elucidate many diabetic phenomena which are as yet unexplained. What evidence there is suggests that the effect of hunger on the nerves and musculature is rather to improve their condition than to do them any harm. It causes a slight fall in blood pressure, but a constant level is soon reached. A change from a meat to a vegetarian diet, according to O. Müller and M. Gänsslen, quoted by Richter, improved the state of the peripheral circulation; this is because meat proteins cause spasm of the arterioles and dilatation of the capillaries, a condition which is rectified when they are removed from the diet. For

[3] Deut. Med. Woch., 1928, i., 1067.

the victims of Graves's disease fasting is indicated. War-time researches showed that compulsory semi-starvation was beneficial to over-active thyroids, and it is probably this action on the thyroid which determines the drop in basal metabolism. Fasting seems to have no deleterious after-effects. Oxidation is apt to be somewhat unduly rapid when the fast is first broken, and the cells show such a large capacity for absorbing protein as seems to contradict all the known laws of nitrogen metabolism. According to Richter, fasting should benefit disorders of carbohydrate metabolism (although the pancreas may suffer in diabetic patients) and spastic disorders of the blood-vessels such as glomerulonephritis. In allergic conditions such as migraine, eclampsia, epilepsy, and asthma it acts by reducing the intake of foreign proteins. The leakage of protein into the blood stream through the intestinal mucosa is responsible for a multitude of ailments, and the alteration in the membranes is thought by some workers to be due to an interference by unwise dieting with the balance of flora in the bowel. A fast will often restore this balance. Fasting for high blood pressure is, in Prof. Richter's opinion, not indicated, since the pressure is not appreciably altered. Summing up, he likens its action to the stimulation of a foreign protein, but gives a warning that the estimation of the patient's tolerance is a difficult matter.

AMYLOID DISEASE.

THE cure of three out of 15 patients in whom the existence of amyloid disease was definitely proved is recorded by Prof. J. H. Waldenström in a beautifully illustrated monograph [1] on the formation and disappearance of this condition.

The author is unable to tell us anything new about the chemical structure of amyloid. He notes that it is a protein substance rich in tyrosin, and suggests that the toxic effects of prolonged suppuration prevent the formation of certain unknown proteolytic enzymes; in the absence of these the body becomes saturated with this protein substance which is deposited along the visceral blood-vessels. As a result of considerable clinical and pathological investigation he holds that if amyloid occurs at all it is invariably found in the liver, where it is evenly distributed. A further observation made is that a liver may be rich in perivascular amyloid deposit and yet show no enlargement, because of the tendency for the amyloid strands to crush the liver parenchyma. Prof. Waldenström believes that a mixed infection is necessary for the production of amyloid, but in spite of careful search he could not incriminate any particular combination of organisms. By protein saturation he produced amyloid in mice. He found that one mouse in four is amyloid-immune, and believes that there is a similar constant proportion of human subjects amyloid-immune. The production of amyloid seems to take about two years from the time of the establishment of the septic focus; and about the same period is required for its eradication. Prof. Waldenström's treatment for the causative surgical lesion is conservative; at his hospital the patients live in big sunny verandas, and are given abundance of butter and cream. The diagnostic methods adopted in suspected amyloid disease are drastic, but leave no doubt as to the nature of the condition. A trocar and cannula similar to a lumbar puncture needle, except that its calibre is 1½ mm., is thrust into the liver and the trocar is withdrawn. The cannula is thrust forwards about 2 cm. and twisted slightly in its long axis. A rod of liver tissue is thus cut, withdrawn from the cannula by a powerful little suction syringe, and examined microscopically. In each of the three cured cases at least three liver punctures were made, and by sections of material so obtained Prof. Waldenström demonstrated successively over a period of about three years normal liver tissue, liver tissue stuffed with amyloid deposit and finally restored normal liver tissue. In THE LANCET of July 21st Dr. G. F. Walker recorded a case of amyloid disease of considerable duration which yielded to treatment, and we welcome this further evidence that a disease which was long held to be both common and fatal is now not only rare but also in certain conditions curable.

[1] Act. Chi. Scand., 1928, lxiii., 479.

STRONTIUM FOR MIGRAINE.

GOOD results from a new method of treatment of migraine are reported by Dr. Max Serog, of Breslau, in a paper [1] which has just been published. Having found, in occasional instances, an improvement after intravenous injection of a preparation of strontium, he made a systematic trial of treatment with this metal and now reports the results in 20 cases. All the patients experienced great relief; many of them suffered previously from very frequent attacks, and, after a course of strontium, were free from headaches for many weeks; some are described as being "quite free" from attacks but, unfortunately, it is not stated how long such patients were kept under observation. The preparation used by Dr. Serog was "neostrontan," made by the firm of Tosse, Hamburg. Five cubic centimetres of a 10 per cent. solution of this strontium derivative were given intravenously, followed at intervals of two days by two injections of 5 c.cm. each of a 20 per cent. solution. The injections were well tolerated; the only unpleasant symptom was a feeling of heat or flushing of the face, and this could be greatly reduced if the injection was given very slowly and, when the flushing began, temporarily stopped until it had passed off. The best results were obtained with the younger patients. It is noteworthy that in several cases it was possible to cut short an attack of migraine by giving an injection of neostrontan—even when the attack was at its height. It seems that this treatment is capable of attaining successful results, especially in cases in which the attacks are very frequent, and it may be used either in combination with other methods or where other methods have failed. But the path of the physician is strewn with discarded remedies for migraine.

[1] Medizinische Klink No. 33, August 17th, 1928, p 1279.

CURRENT VITAL STATISTICS.

ON another page we deal with some of the lessons which may be drawn from the text of the Registrar-General's Review of the year 1926. In the meantime the early appearance of Part I. (Medical Tables [2]) of the Review for 1927 has almost bridged the gap between the two years. The salient features of this review were embodied in a provisional statement,[3] which has, of course, not been substantially modified. The birth-rate of 16·6 for the year 1927 is the lowest rate recorded since the establishment of civil registration in this country, the lowest rates previously being those for 1918 (the last year of the war)—viz., 17·7 and for 1926—viz., 17·8 per 1000 population. The death-rate was 12·3 per 1000 population, slightly higher than for any year since 1922. The rise affects the two sexes almost equally, and was due to a severe epidemic of influenza in the March quarter. The death-rate in the June quarter was the lowest on record for the second quarter of the year, while the rates in the third and fourth quarters were below the average rate in the corresponding quarters of the last five years. The deaths of infants under 1 year of age were equal to 70 per 1000 births, being the same as for the previous year; thus the two years 1926 and 1927 have the lowest infant mortality-rate on record except only that for 1923—viz., 69. The mortality from the infectious diseases differed little from that for the previous year, except that the deaths from influenza numbered 22,263 and were equal to a rate

[2] H.M. Stationery Office. 15s.
[3] See THE LANCET, 1928, i., 141.

of 567 per million living. The mortality-rates recorded in earlier epidemics were as follows:—

1848 .. 459	1892 .. 533	1918 .. 3078	1922 .. 563
1891 .. 574	1900 .. 504	1919 .. 1181	

From these figures it will be seen that the mortality in 1927 was the highest recorded since the great epidemic of 1918–19, and was but 7 per million below that of 1891. The increased mortality from pulmonary tuberculosis and heart and respiratory diseases may also be in part due to the prevalence of influenza. The death-rate from cancer was 1376 per million population, or 14 per million higher than in 1926, being the highest crude death-rate yet recorded. The 4907 deaths from suicide were equal to a rate of 125 per million, which is the highest recorded rate from this cause; the rates in the three preceding years were 96, 105, and 114. The Review indicates the increasing use of lysol and coal-gas as means of self-destruction.

Prof. Robert Muir, Sir John Parsons, and Sir Charles Trevelyan have been appointed members of the Medical Research Council, succeeding Prof. G. Dreyer, Sir Archibald Garrod, and Mr. William Graham.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

(DENTAL BRANCH.)

IN the Educational Number of THE LANCET last week, when placing before our readers the advantages offered by joining this Service, we were unable to give the following current rates with regard to Dental Officers, the information not arriving in time for press.

On the completion of two years' service in the rank of Surgeon Lieutenant Commander (D), dental officers on the Active List are eligible for a three months' post-graduate course at a dental hospital and school at the public expense, and will draw full pay while attending the course.

Pay.—The current rates of full pay for Dental Officers are as follows:—

	£	£
Surgeon Lieutenant (D)		377–462
Surgeon Lieutenant Commander (D) (promoted after six years' service)		556–687
Surgeon Commander (D) (promoted by selection to fill vacancies in Establishment)		730–933
Surgeon Captain (D) (promoted by selection to fill vacancy in Establishment)		1073–1329

The Regulations regarding Pension and Withdrawal Gratuities are the same as for Medical Officers in the corresponding Ranks.

HONORARY APPOINTMENTS TO THE KING.

The King has approved of the appointment of Lieut.-Colonel R. McCarrison, C.I.E., and Lieut.-Colonel W. H. Leonard to be honorary physicians to His Majesty, with the brevet rank of Colonel, in succession to Colonel C. R. Bakhle and Major-General A. A. Gibbs, retired; and the appointment of Lieut.-Colonel G. D. Franklin, C.I.E., O.B.E., to be honorary surgeon to His Majesty, with the brevet rank of Colonel, in succession to Colonel R. W. Knox, D.S.O., retired.

RESTRICTED LEAVE OWING TO SMALL-POX.

Owing to the presence of small-pox in the area, restrictions have been placed on the granting of leave at Brechin (Forfarshire) and Kingston-upon-Hull. There are now two districts scheduled in London (St. Marylebone and Wandsworth) and 53 outside.

ROYAL NAVAL MEDICAL SERVICE.

To be Surg. Lts.: J. G. Ollerenshaw, T. W. Froggatt, A. N. Forsyth, C. H. Birt, A. J. Burden, D. R. F. Bertram and D. L. Pow.

Sub-Lts. to be Lts.: B. E. W. Logan, J. B. G. Temple, K. H. Fraser, and H. C. Browne.

The following appts. are notified: Surg. Comdrs. C. F. O. Sankey to *Barham*, and to *Warspite* (on transfer of flag); and G. H. Hayes to *Ramillies*. Surg. Lts. J. Johnston to *Resolution*; L. P. Spero to *Dahlia*; H. J. McCann to *Pembroke* for R.N. Barracks, Chatham, temp. supy.; V. G. Horan to *Heliotrope*; C. B. Fox to *Rodney*; D. R. Campbell to *Iroquois*; I. J. Corbett to *Victory* for R.N. Barracks, Portsmouth, temp.; and S. J. Savage to *Pembroke* for R. N. Hospital, Chatham, temp.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lt.-Comdr. W. J. Payne and Surg. Lt. R. L. Stubbs to *Victory*, for R.N. Hospl., Haslar, for training.

ROYAL ARMY MEDICAL CORPS.

Maj. G. S. Parkinson retires on retd. pay and is granted the rank of Lt.-Col.

Maj. J. St. A. Maughan to be Lt.-Col., vice Lt.-Col. W. C. Croly to retd. pay.

Capt. J. Vallance, Reg. Army Res. of Off., relinquishes his appt. and resumes the rank of Maj.

Capts. R. H. C. Pryn and T. L. Henderson to be Majs.

Capt. B. C. W. Pasco, late R.A.M.C., to be temp. Capt., and temporarily relinquishes the rank of Capt.

Lts. (on prob.) W. R. C. Spicer, J. H. Anderson, T. F. M. Woods, S. M. Burrows, G. T. L. Archer, M. R. Burke, P. J. L. Capon, D. R. W. Burbury, K. McNeill, P. Dwyer, P. W. A. Agnew, and J. W. Kendall are confirmed in their rank.

The undermentioned Lts. from the secd. list are restd. to the estab.: L. R. S. MacFarlane and W. F. Lane.

To be Lts. on prob.: Lt. A. T. H. Marsden, from R.A.M.C. (T.A.); 2nd Lt. L. R. H. Keatinge, from T.A. Res. of Off., Gen. List; Temp. Lt. G. L. Grieve, and relinquishes the temp. rank of Lt.

The undermentioned Lts. on prob. are secd.: F. Welsh, N. J. Nicholson, H. W. Daukes, and D. C. MacE. Macpherson.

ARMY DENTAL CORPS.

Capt. A. Gibson to be Maj.

Temp. Lt. H. Quinlan, Dental Surg., Gen. List, to be Lt.

ARMY RESERVE OF OFFICERS.

Cols. J. W. Leake and F. Ashe, having attained the age limit of liability to recall, cease to belong to the Res. of Off.

Maj. J. H. Barbour, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY.

Maj. E. T. Burke resigns his commn. and is granted the rank of Lt.-Col.

Capt. J. V. Bates to be Lt.-Col. and to comd. the 131st (Home Counties) Fd. Amb., vice Lt.-Col. P. J. Gaffikin, vacated.

Capt. E. B. Hinde resigns his commn. and is granted the rank of Maj.

2nd Lt. W. E. Hayes (late R.E.) to be Lt.

Supernumerary for service with O.T.C.: Capt. H. P. Malcolm to be Maj.

ROYAL AIR FORCE.

Flight Lt. A. F. Cook is seconded for duty with the Transjordan Frontier Force.

Flying Officer E. A. Rice is promoted to the rank of Flight Lt.

Flight Lt. C. Sempill de Segundo relinquishes his temporary commission on completion of service.

RESERVE OF AIR FORCE OFFICERS.

Squadron Leader E. P. Punch relinquishes his commission on completion of service.

INDIAN MEDICAL SERVICE.

Lt.-Col. T. Hunter retires.

GUY'S HOSPITAL.—The annual report upon the work of Thomas Guy's foundation shows that in 1927 11,313 in-patients were admitted, an increase of 1000 over the previous year. There were 122,446 new out-patients who made 537,676 attendances; they cost 7*s.* each. The in-patients cost £11 19*s.* 2*d.* each. The total income was £164,000 and the expenditure £172,000; the accumulated adverse balance of expenditure over income now exceeds £100,000, and an appeal is being made for £500,000 for the re-endowment of the hospital.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

I.

THE WIDAL OR AGGLUTINATION REACTION IN THE DIAGNOSIS OF INFECTIONS

DUE TO ENTERIC GROUP OF MICRO-ORGANISMS.

By A. B. Rosher, M.R.C.S., D.P.H.,
DIRECTOR OF THE CHARING CROSS HOSPITAL INSTITUTE OF PATHOLOGY.

In order to estimate the value and limitations of the agglutination reaction in the diagnosis of these infections it is necessary to have some knowledge of the modern technique employed for the test and to appreciate the behaviour of agglutinins under certain conditions.

Macroscopic Method.

The macroscopic technique is nowadays almost invariably used in preference to the microscopic method. By this means the end-point of agglutination can be obtained more accurately, and there is no chance of the laboratory worker being infected, since dead bacilli are used instead of living ones. The test is very sensitive when this method is employed, and it is by no means uncommon to demonstrate agglutinins in a serum after it has been diluted 1/40,000 times. The highest dilution of patient's serum still having the power of agglutinating the bacilli is commonly called the "agglutinin titre." The criterion of diagnosis by the old-fashioned microscopic method was an agglutinin titre in the neighbourhood of 1/100, whereas agglutination to this titre could not by itself be regarded as diagnostic when the macroscopic technique is employed.

It is customary to put the patient's serum up against *B. typhosus*, *B. paratyphosus* A, B, and C, *B. enteritidis* Gaertner, and *B. aertrycke*. The vast majority of infections in this country are due to *B. typhosus* and *B. paratyphosus* B.

B. enteritidis Gaertner and *B. aertrycke* are the organisms usually associated with food poisoning when the symptoms of acute gastro-enteritis predominate, but on rare occasions are stated to give rise to febrile conditions resembling enteric in some respects.[1 2 3]

Collection of Blood.

More blood is required when the macroscopic test is employed, and this represents the only disadvantage of the method. Not less than 2 or 3 c.cm. of blood are desirable, and whatever method of collection is employed it is advisable that the tube or syringe into which it is collected should be perfectly dry and free from any chemical substance, otherwise the blood is likely to become hæmolysed and useless for the test.

If a syringe be used and sterilised by boiling or with alcohol and ether, it is essential to wash it out with sterile saline before withdrawing the blood. The blood is usually obtained either (1) by pricking the finger or thumb with a No. 2 triangular-pointed needle, a small indiarubber tourniquet having been previously applied to the base of the digit; or (2) by inserting a hollow needle into the median basilic vein and collecting the blood direct into a syringe or into a test-tube.

However, by using a Behring venule ample quantity of blood can be obtained quite easily, and the procedure is practically painless. Special venules are supplied for the diagnosis of enteric whereby blood is drawn from the patient for the agglutination test and blood culture simultaneously, thereby saving the patient the inconvenience of being punctured twice. Since the blood goes straight into the culture medium the risk of contamination is eliminated.

Technique.

Briefly, the technique is as follows:—

The blood is allowed to clot and, after centrifuging, the serum is drawn off. Various dilutions—e.g., 1/10, 1/20, 1/40, &c., to 1/1280—of the serum in normal saline are made in a series of test-tubes. The dilutions are made with graduated pipettes or by using Dreyer's dropping pipettes.[4]

Seven Dreyer's agglutination tubes[4] are then placed in a rack and 0·5 c.cm. of an emulsion of dead typhoid bacilli is put in each tube. (These emulsions are made by growing the organisms in bouillon for 24 hours, after which a small quantity of formalin is added to kill them. The emulsion is then standardised to contain so many organisms per c.cm., and if kept cool and in the dark can be used for some months.) Half a cubic centimetre of the 1/10 dilution of the patient's serum is now transferred to the first agglutination tube, and the same amount of the 1/20 to the second tube, and so on with all the dilutions. We now have a series of seven tubes containing a range of dilutions from 1/20 to 1/1280 of the patient's serum mixed with typhoid emulsion; each tube contains 1 c.cm. of fluid. The patient's serum is then put up against emulsions of paratyphoid bacilli in exactly the same manner, seven tubes being devoted to each organism. The rack is then placed in a water-bath at 55° C. for two hours or so. Agglutination usually commences in 10 to 15 minutes, and can easily be observed with the naked eye against a dark background. The contents of tubes showing no agglutination appear slightly cloudy, owing to the millions of bacilli in suspension, but when agglutination has occurred they become aggregated into large clumps which fall to the bottom of the tubes, resembling a precipitate, and the supernatant fluid is quite clear. The tubes are inspected occasionally, and if any organism is agglutinated in all dilutions up to 1/1280 further dilutions are put up—e.g., 1/2560, 1/5120, 1/10,240, &c.—so that the end-point of agglutination can be established.

Occurrence of Agglutinins in the Serum of Apparently Normal People.

If we test blood from these members of the population who have not been inoculated with T.A.B. vaccine and give no history of having had enteric against this group of organisms, we find that about 4 per cent. of them agglutinate *B. typhosus*, *B. paratyphosus* B and C, and *B. enteritidis* Gaertner, whereas about 10 per cent. react with *B. aertrycke* (Mutton).[5] The reason for this agglutination is unexplained, but it is possible that the people have passed through unrecognised infections with these organisms or closely allied ones. (A point in favour of this theory is the absence of people who can agglutinate *B. paratyphosus* A, for infections with this organism are extremely rare in the British Isles.) Some of these people may be carriers, for it is well recognised that the serum of the majority of carriers contains agglutinins; not enough cases have been investigated for any definite conclusions to be formed. The majority of sera give low agglutination titres, such as 1/20, 1/40, 1/80, but occasionally one finds a serum that will agglutinate when diluted as much as 1/640 times. As far as one can ascertain, these titres remain constant and do not fluctuate over a period of weeks.

Behaviour of Agglutinins as a Result of Infection.

Agglutinins do not appear in the blood until the end of the first week of disease, and therefore it is useless to expect any immediate diagnostic information from the reaction before this. Nevertheless, it is very important to perform the test during the first few days, since a negative result is invaluable in assessing the significance of results obtained later in the disease, especially in cases which only give low agglutinin titres throughout. However, it is during the early days that the chances of isolating the causative organism from the blood, fæces, &c., are best, and therefore cultures should also be made.

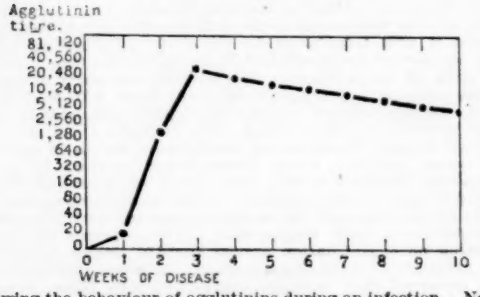
The agglutinins increase rapidly in intensity, reaching a maximum towards the end of the third week and then start to fall gradually (see Chart 1). They fade away over a period of months, but may last for years. There is a considerable variation in the amount of agglutinin production in different cases. Thus sometimes the highest agglutinin titre reached may be more than 1/40,000, whereas in other cases the maximum titre may be on the 1/100 mark. The

latter event is unusual, and this is fortunate, since in these cases a diagnosis cannot be established on a single test, and repeated tests have to be performed (see below).

Behaviour of Agglutinins Resulting from Protective Inoculation.

As a result of inoculating a person with a vaccine prepared from typhoid and paratyphoid bacilli (T.A.B.), agglutinins to these various organisms appear

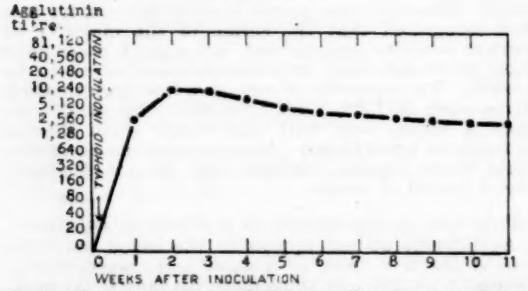
CHART 1.



Showing the behaviour of agglutinins during an infection. Note the rapid rise in the second and third weeks.

in the serum (see Chart 2). They reach their maximum after two or three weeks, and then usually fall to a level round about the 1/500 mark: here they remain for many years, and in some cases no doubt for a lifetime. The tendency is for them to get less as time goes on, but the process is so gradual that when tests are made once a week for several weeks and no change in agglutinin titre can be demonstrated. There is considerable evidence[6] to show that nothing will cause any fluctuation of the agglutinin titre at this stage unless a person becomes infected with one of the enteric group of bacilli. In the event of this happening the agglutinins for the infecting organism rapidly rise and reach a maximum towards the end of the third week. Then they gradually fall, and in all probability become stationary once again on a level somewhat higher than they were before the

CHART 2.



Showing the behaviour of agglutinins resulting from inoculation.

infection took place. Thus the behaviour of the agglutinins in a person suffering from enteric infection is the same whether the person has been inoculated or not, except that in the inoculated they start from a definite level (see Chart 3), whereas in the uninoculated they start from zero.

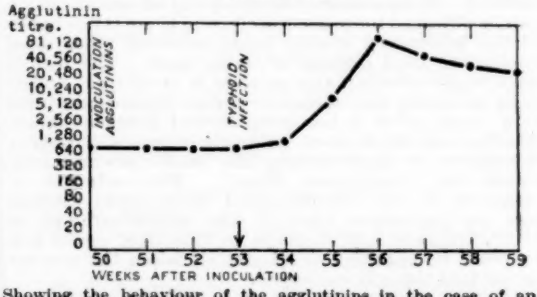
Diagnosis of Infection Agglutinins.

If we are confronted with a serum which agglutinates one or more of these organisms it should be clear from the above remarks that the agglutination may be due to: (1) "normal" agglutinins; (2) infection agglutinins; (3) inoculation agglutinins; (4) a combination of the above. It then becomes necessary to distinguish infection agglutinins from the remainder. One can usually rule out inoculation agglutinins by questioning the patient; but, apart from this, the fact that a serum agglutinates the three organisms, *B. typhosus*, *B. paratyphosus* A and B, is usually sufficient indication that inoculation has taken place.

The essentials for diagnosis *in the uninoculated* must then be considered. A titre of 1/1000 must always be regarded as strongly suspicious, and if it is considerably higher than this a presumptive diagnosis of infection can be made. It must be remembered, however, that occasionally titres as high as this are not registered even when the agglutination is at its maximum at the end of the third week. In these cases it is necessary to perform two or even three tests with an interval of three or four days between them; if there is any appreciable increase or decrease in titre (according to the stage of the disease) a diagnosis of infection is justified. The occurrence of these cases makes it of the utmost importance to test the blood in the first few days of disease, for if it is then negative and a few days later agglutinins appear, a diagnosis of infection is justified, even if the titre of the second test is only on the 1/20 or 1/40 mark.

The diagnosis by means of repeated tests is fairly easy during the first three weeks of disease, since the rise in agglutinins is rapid; but after this period it

CHART 3.



Showing the behaviour of the agglutinins in the case of an inoculated person becoming infected. This chart gives an idea of what would happen to the agglutinins if a person became infected with *B. typhosus* 53 weeks after being inoculated.

is less satisfactory, and may be a lengthy procedure, for the fall in agglutinins may be very gradual.

In the inoculated a single test by itself is of very little value, and it is essential to perform, at any rate, two tests with an interval of three or four days between them in order to demonstrate the fluctuation in titre characteristic of infection. As has been noted above, after inoculation agglutinins have settled down to a steady level no change can be detected in them over a short period unless the patient becomes infected with organisms of the enteric group.

Value of the Test.

The agglutination reaction thus has a definite value in the diagnosis of these infections, and may be even more useful in the future. The work of E. Weil and A. Felix[7] and others has shown that typhoid and paratyphoid bacilli contain two kinds of antigen, which differ in their resistance to heat and to certain chemical agents. These, for reasons which do not concern us here, have come to be called the H and O antigens. It has been claimed by Felix that agglutinins acting on the O antigens appear only as a result of infection, and that, by using an emulsion containing O antigens, it is possible to arrive at a diagnosis on the result of a single agglutination test even in an inoculated individual. Burnet[8] has recorded similar results. If these observations are widely confirmed by future investigations they will clearly make an important advance in the diagnostic application of the test.

The great value of the agglutination test, compared with other methods of diagnosis of these infections, is the fact that agglutinins after the first week or so are almost always present, and therefore should

be capable of demonstration, whereas the causative organisms can only be isolated from the blood in from 70 to 80 per cent. of cases, and from the fæces in about 50 per cent. A blood culture when positive is the most satisfactory means of diagnosis, because it gives conclusive proof of infection, while the agglutination reaction only gives indirect proof. The presence of typhoid or paratyphoid bacilli in the fæces or urine means that the patient is either a carrier or is suffering from an active infection with these organisms, and it is permissible to assume an active infection if the symptoms are sufficiently suggestive.

Each method of diagnosis, therefore, has its limitations, and in order to obtain the best results it is essential on encountering a suspected case: (1) to make cultures from the blood, fæces, urine, and sputum (if present); (2) to perform an agglutination reaction; (3) to perform a leucocyte count. These three investigations should be carried out whatever the stage of disease. The leucocyte count is invaluable because it takes very little time to perform, and if a leucopenia is present one can usually rule out most of the infections likely to resemble enteric clinically, with the exception of influenza. The result of the agglutination reaction should be obtainable in two or three hours, but isolation and identification of the causative organism may take some days.

The Diagnosis of Bacterial Food Poisoning.

The agglutination test also has some value in the diagnosis of bacterial food poisoning. These infections are usually due to various types of *B. aertrycke* and to *B. enteritidis* Gaertner. Blood cultures are of very little value, and the diagnosis is usually made by isolating the causative organism from the fæces. The agglutination reaction affords valuable support, but needs to be interpreted with care, owing to the "normal" people who agglutinate these organisms; furthermore, people who have been inoculated with T.A.B. frequently agglutinate *B. aertrycke* and *B. enteritidis* Gaertner, owing to the close serological relationship of members of this group of bacilli.

However, this non-specific or group agglutination as regards *B. aertrycke* can be avoided by using type emulsions, as shown by Andrewes.[9]

Conclusion.

In conclusion, attention must be drawn to the importance of supplying the bacteriologist with brief details of the case under investigation, especially regarding the duration of the disease, inoculation, and so forth. Neglect to do this is, no doubt, responsible for the complaints sometimes made by practitioners of incomprehensible laboratory reports. The successful diagnosis of enteric can only be accomplished by close coöperation between the clinician and the laboratory worker.

References.

1. Rosher, A. B., and Wilson, G. S.: THE LANCET, 1921, i., 16.
2. McNee, S. W.: THE LANCET, 1921, i., 218.
3. Perry, H. M., and Tidy, H. L.: Medical Research Council, Spec. Rep. Series No. 24.
4. Dreyer, G.: Medical Research Council, Spec. Rep. Series Nos. 51, 119.
5. Rosher, A. B., and Fielden, H. A.: THE LANCET, 1922, i., 1088.
6. Rosher, A. B.: THE LANCET, 1924, ii., 110.
7. Felix, A.: Jour. Immunology, 1924, ix., 115.
8. Burnet, F. M.: Brit. Jour. Exper. Path., 1924, v., 251.
9. Andrewes, F. W.: Jour. Path. and Bact., 1922, xxv., 505.

MARIE CÉLESTE SAMARITAN SOCIETY.—During the first six months of the present year this society, which was established to help patients of the London Hospital, assisted 6739 persons, an increase of 402 as compared with the corresponding period of last year. Surgical appliances have been supplied to 2625 patients, and 1323 have been sent to the sea or the country.

TREASURER OF RADCLIFFE INFIRMARY.—The Rev. G. B. Cronshaw, upon his appointment as Principal of St. Edmund Hall, has resigned the treasurership of the Radcliffe Infirmary, which he has held for the last 18 years. During that period the hospital, by reason of his energy and activity, has been greatly improved and its usefulness widely extended. In recognition of his services Mr. Cronshaw has been made a vice-president.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT CARDIFF.

(*Continued from p. 351.*)

SECTION OF MEDICAL SOCIOLOGY.

THE FALLING BIRTH-RATE.

Prof. W. J. ROBERTS (University College, South Wales), in opening the subject from

The Economic Aspect,

referred to the writings of Malthus, and stated that nowadays no simple and definite theory as to the law of population held the field. Official statistical data threw no light on the means by which the reduction of births was secured. Apprehensions had found expression with respect to the decline of the French population, and in the U.S.A. as to the higher birth-rate among unassimilated immigrants when compared with the pure Americans. It was also believed that in Britain birth control prevailed more widely among the relatively better situated. Sir Arthur Newsholme had dealt with the thesis that it was not a matter of indifference as to which races peopled the unfilled portions of the world and took the preponderant share in shaping the destinies of mankind. He had also referred to the fact that in the earlier years of certain industries each child was his parents' savings bank, and that now the child was a less profitable asset than in the past. Economic inquiry tended to destroy utterly the impression that the people of this island were divided by social circumstances into breeds, some of which were fitted by origin and nature to bear rule over the others. The economist wished to have many questions answered, both by the biologist and the social investigator. For example: Are the "comfortable classes" the result of biological excellence? Are the classes which exhibit aptitude for leadership and command in danger of perishing if their stock is not continued? The obstacles to the growth of population and the causes of misery and restricted livelihood in the mass of the people are not due to any law of population or to the niggardliness of nature. Neither our own little planet nor our own little island was overcrowded. The causes were rather to be sought in habits and institutions whose origin and purpose was mastery, privilege, and monopoly. The continuous unfolding of productive capacity depended on the prevalence of justice throughout the whole economic community. He did not pretend to any social or medical knowledge, but as an economist would like answers to many questions. How did gambling or the desire to get rich quickly operate? What was the effect of outdoor games and a life of pleasure on fertility? What was the effect of the conventions of each social class on its individuals? Did people follow medical advice on these subjects? And did people really know why they acted in a certain way? The term "overcrowding" was used very loosely, the standards adopted were rough, and halving of the population did not necessarily diminish overcrowding, even if the number of houses remained the same. Ordinary economic explanations were of no avail for this problem, and far more detailed inquiry and intelligent questioning of all classes by people who could put themselves in other peoples' places was needed.

The Biological Aspect.

Prof. F. A. E. CREW (Animal Breeding Research Department, University of Edinburgh) said the birth-rate of this country had fallen and was still falling, and that this was a matter of grave concern to those who chose to envisage the overwhelming of our prized culture by hordes of barbarians of this or that particular hue, but all equally and amazingly fertile. To the biologist, however, there was nothing remarkable and nothing necessarily ominous in this decline. If the conclusions which had emerged from the work of Pearl, Elton and others had been known when the birth-rate was soaring, the present fall would have

been foreseen and accurately predicted. The growth of all living things, whether pumpkins or peoples, followed the law enunciated by Pearl—namely, that the population at first grows slowly, gradually gains impetus, and then grows rapidly. Rapid growth is succeeded by a slowing off which ends in no growth at all. Increasing density led ultimately to complete saturation, and reduction in population was achieved by removing the surplus or by reducing the rate of growth. The first method of reduction was the catastrophic and was exemplified in rabbits, mice, and human populations, the catastrophic instruments being war, pestilence, and famine. The second or gradual method of reduction was revealed in the work of Pearl on Drosophila, the primary factor being a fall of fecundity and fertility with increasing density. Among pigs under similar conditions there was noticed a reduction in the size of the litters. Group biology was a new study. Experiments with animals did not necessarily apply to human beings. Man could adapt himself to a changed environment, and every advance in knowledge which enabled him to derive from his environment things conducive to his material welfare increased the potentialities for population growth in a given area. A rising birth-rate heralded an extension of the conquest of man of his environment, while a falling birth-rate was an indication that mankind was temporarily imprisoned. The birth-rate was now falling because this was the end of a population growth-cycle. A new growth-cycle would be initiated and the birth-rate would rise when those factors which were at present overriding the inherent tendency to increase were recognised or removed.

Fecundity was affected by inborn and environmental factors and different races, stocks, and individuals were distinguished, one from the other, by true-breeding differences in fecundity. In the human subject the tendency to multiple births was faithfully transmitted through both male and females. The time of onset of puberty and of the climacteric and also longevity were true-breeding characters. It was possible that in the past the inherently longer-lived had contributed disproportionately to the population, and that under modern conditions the shorter-lived lived longer and transmitted to their progeny a lowered fecundity. This would be a reasonable explanation of a lowered birth-rate if it could be shown that there was a high correlation between longevity and high reproductive rate. This country was now relatively overcrowded. Lack of houses was an indication of a relative regional over-population. If the builders failed to keep pace with the babies the birth-rate would fall. It was not known how density provoked its results, but the work of Pitt-Rivers suggested that sheer discouragement was enough to destroy a people.

What effect had the conflict of cultures? The birth-rate of the vanishing peoples of the South Seas was steadily falling, apparently because these peoples were discontented and discouraged, and consequently dying out. Did the arrival of an immigrant Irishman in Glasgow prevent a Scottish baby from being born? There must be joyousness, eagerness, roominess for potential parents or else the babies would not come. The birds, when they mated, built nests, but for human lovers the tenements were built by those who were ignorant of the relation which existed between population density and the reproductive rate. The sex ratio could not as yet be controlled. The fact that many women could not become mothers could not explain the falling birth-rate. A high marriage-rate associated with a low per-reproductive-woman birth-rate could yield the same reproductive rate as a low marriage-rate associated with a high per-reproductive-woman birth-rate. Few marriages and larger families might yield a high reproductive rate with less variety among the offspring and surely variety was to be desired. The present low birth-rate was in part due to sterile marriages. Two individuals mutually sterile might be fruitful in other matings. Possibly recent social and economic developments had encouraged the survival of stocks, which were relatively infecund or which reacted more readily to the disharmonies of industrialism. The peak of sexual activity was at about 29 in the male and the woman's reproductive power dropped shortly after 30.

Prosperity implied plentiful food and comforts, and therefore a lower death-rate and a rising birth-rate, and an unequally distributed prosperity might create differential fertility among the social grades. If a large section of the community were relatively unsuccessful and left with no other modes of nervous release than excessive drinking and sexual over-indulgence, there would be a higher reproductive rate in this section than among the community as a whole. Social advancement implied a lower reproductive rate, as those who experienced it were presented with more varied modes of self-expression and self-indulgence. Unless it could be shown that the methods adopted for birth control were effectual, it could not be accepted that birth control was largely responsible for a fall in the birth-rate. The fall in the birth-rate had been too gentle; it had proceeded with evolutionary steadiness and had been universal. This suggested the expression of some biological factor. He doubted if birth control had affected the crude birth-rate, but suggested that it might have slammed the doors of suburban houses to open those of a slum. The problem, thus, was to determine the biological worthiness of the social grades. What was fitness? There was no reason to suppose that it was linked with high-grade fecundity. The elephant and the earwig were fit and had quite different reproductive rates. Was the human standard of fitness to be good physique, good brain, and low-grade fecundity? If so, this ideal could be found abundantly among all social grades. The suggestion that the relatively unfit were more abundant among the socially submerged was not necessarily true. It was easier for a good man to climb out of the gutter than for a biologically unworthy scion of an established family to descend because the latter was buoyed up by his associates. If birth control had played a part, it would have been well for humanity if it had been the only responsible agent, used intelligently by a people, who knew what they did and why they did it. At present it seemed that the methods adopted were too uncertain to allow of any policy being based upon them. In his concluding remarks Prof. Crew said he had tried to be provocative and had incautiously stepped from the solid ground of fact to the uncertain terrain of opinion, but that he set no great store on his opinions and would not mind exchanging them for better ones.

The Medical Aspect.

Sir THOMAS HORDER thought the falling birth-rate was a matter outside the province of medical men. They must have more facts from the biologist and the economist. Sex incompatibility was a mystery and the laws of reproduction were inscrutable. The prolongation of life was a small matter, but the saving of life and the improvement of health were great matters. Old age was on the increase. We had a lower birth-rate and would ultimately have a higher death-rate. A visitor from another planet would be amused to find us worrying over a falling birth-rate when so recently we were complaining of the rapid increase of the population. He did not think the differentiation of the birth-rate resulting in poorer quality came within the doctor's sphere. The husband and wife usually consulted the doctor when they had made up their own minds on this matter. If the doctor was to enter this field he must be taught very differently. If they were to breed from superior parents Government would have to fix a minimum of, say, three children with a double minimum for very superior parents, and subsidies would have to be provided from those who did not comply with the minimum. Sociologists must arouse interest in eugenics before the doctors could take a hand. The profession had stood aloof owing to want of data.

Lady BARRETT (London) dissented from Sir Thomas Horder's view that this was not a matter for the medical profession. She gave many statistics with regard to the fall in the birth-rate, and also gave

statistics with regard to the fertility of women according to their age at marriage, derived from the experience of Scotland in 1855. She concluded that 25 was the best age for marriage. If the true facts were known with regard to the chances of immediate conception many more young couples would begin their married life in a natural manner. If there was danger to the mother from childbearing the family doctor was the best person to advise. Medical students should be taught all that was known on this subject in order that they might give suitable advice to their patients. Unless the medical profession took an interest in this problem and spoke out there was a great danger of race deterioration as the result of the differential birth-rate.

Discussion.

Dr. WILLIAM COLLIER (Oxford) said that for 40 years birth control had been practised in the professional classes, and they had no right to deny information to the working classes. If medical science set itself to improve methods they would be improved. They must not sit on a hedge because the subject was distasteful. Panel practitioners had no time to advise, and should refer their patients to good clinics. A first-class birth control clinic had been inaugurated at Cambridge under medical direction, but in spite of the support of the Oxford Medical Society they had met with much opposition and had been unable to establish one at Oxford.

Dr. LETITIA FAIRFIELD said that the doctor's training gave him no locus standi. More biological data were wanted. Causes of the falling birth-rate were voluntary and involuntary, but the involuntary causes were not really natural laws. Joy in life produced the desire for children, and regard for the health of the mother produced a reasonable form of birth control. She did not think they need worry about the falling birth-rate.

Dr. BINNIE DUNLOP (London) said there was a real demand for information on this subject, and caused some amusement by his suggestion that there should be no more children till all the adults had been satisfactorily provided for.

Mrs. NEVILLE ROLFE dealt with the effect of motivation. The birth-rate in Italy had declined, but it remained high in China and among the Jews, from religious motives. The necessary fillip to the birth-rate referred to by Prof. Crew could readily be supplied by emigration. We had areas crying out for white population, and we ought to emigrate good stock. Under the 1922 Act local authorities could train, equip, and emigrate, but they only emigrated boys. They should go in for group emigration with unbroken British family traditions. Local authorities should send out girls and boys in equal numbers. Emigration was the best means of stemming the decline in the birth-rate.

Dr. N. E. WATERFIELD (Banbury), from his experience as a general practitioner, thought parents asked for and acted on the doctor's advice.

Reply.

Prof. ROBERTS asked if social conditions were just, and suggested that many of these problems would be solved if the ideals of the community were raised.

Prof. CREW agreed with the importance of the motivating force, and said a new religion was needed. Emigrants should be successful people at the reproductive age.

SECTION OF PREVENTIVE MEDICINE.

CONTROL OF INFECTIOUS DISEASE.

The value of present methods of controlling infectious diseases was discussed under the presidency of Dr. E. COLSTON WILLIAMS (Cardiff).

Small-pox.

Dr. L. J. RAJCHMANN (Director of the Health Organisation, League of Nations) surveyed the behaviour of small-pox in the various countries of the world. Events at Rio de Janeiro in 1926, and in Algeria in 1926 and 1927, showed, he said, that severe outbreaks of small-pox had not ceased to occur. During 1927 a large area of Europe was free from small-pox; since 1919 there had been a huge drop in its prevalence in Rumania and Soviet Russia; in each case notification had improved. In the Far East there had also been a drop. During the late war England and France remained clear; in Germany in 1917 the barriers against small-pox broke down, and this was much more the case in Austria, Hungary, and Italy. The crest was reached in 1920; after that came the decline. In 1927 there were no cases in 15 European countries, and very few in 15 others. In France, in spite of efficient vaccination, the prevalence was said to be kept up by imported cases. In France, Germany, and Italy the disease was of the classical type. In Switzerland a mild type of small-pox, similar to that in England at present, was prevalent from 1921 to 1926, but has now entirely disappeared. The case mortality of small-pox varied greatly not only between one country and another, but also from year to year. Italian statistics were particularly interesting, and showed that the severity of the disease and its case fatality underwent cyclical variation, roughly in seven-year periods. There was no evidence that the classical type was being replaced anywhere by the mild type. The case fatality in England from the mild type was now between 0·2 and 0·3 per cent. In Germany during 1919 to 1922 the case fatality varied from 12 to 16 per cent. In France the case fatality was between 28 and 29 per cent. from 1919 to 1921. In Rumania the figure of 28 per cent. for 1919 became 12 per cent. in 1923. In extra-European countries the figure varied from 10 to 30 per cent. In India and Korea during 1926 and 1927 it was about 25 per cent. In Java the figure 26 per cent. in 1918 fell to 12 per cent. in 1923, and was only 2·7 per cent. in 1927—a very low figure for a tropical country. Figures for Africa show that a low case fatality of 2 to 10 is not uncommon, but that severe epidemics with a 30 per cent. mortality do occur. In European countries there are no statistics for trustworthy death-rates according to age-periods, but the Italian statistics show a marked excess of the female rate at ages from 20 to 44. Owing to the influence of the vaccinal condition it is difficult to determine whether fluctuations due to any other cause occur. The seasonal distribution of the mild and severe types did not differ materially.

Dr. J. MIDDLETON MARTIN (Gloucestershire) pointed out that mild small-pox was no new thing, and that in the past inoculation had come into fashion when the type of the disease was mild. The tendency to regard infection as being spread by persons rather than by infected articles was growing, and belief in aerial spread of infection was practically given up. Their main business was to prevent case to case infection. Their principal difficulty was the detection of mild small-pox. Small-pox was not a dual disease but one disease of varying severity. The percentage of vaccinated school-children in Gloucestershire had dropped from 70 to 25, and their present means of control depended upon quickness in detection.

Dr. T. EUSTACE HILL (Durham County) had no doubt that the mild disease was true small-pox. They had had 12,634 cases from 1922 to May 31st, 1928, with 34 deaths. Of the 34 deaths, 6 occurred under 1 month of age, 4 under 3 months, 2 at 1–2 years, 3 at 2–5 years, 3 at 5–15 years, 5 at 15–25 years, 1 at 25–45 years, 5 at 45–65 years, and 5 at 65 and upwards. The cost to the county had been £120,000, but nevertheless he thought they ought to continue isolating the cases as they could not trust to the mild disease breeding true. Discussing methods of control, he argued that it was impossible to make vaccination compulsory at present. He paid tribute to the valuable work done by the port sanitary authorities. Wilful concealment and failure to diagnose impeded prompt notification. All medical officers of health should make themselves expert in diagnosis, and county medical officers of health should act as consultants. The supervision of contacts was not always efficient. They had successfully pooled

the hospital accommodation in Durham County, and they had not found that overcrowding the hospitals had caused septic cases. "Return" cases had occurred owing to the demand for hospital accommodation. Disinfection was still advisable. He had had no experience of the supposed relation between encephalitis and vaccination. (Dr. Rajchmann in his opening remarks mentioned that a Special Commission of the League of Nations was at present investigating this matter.)

Dr. R. P. GARROW (Chesterfield) explained the continuous prevalence of small-pox in this country by the extraordinary mildness of the cases. Even confluent cases were not ill. The refusers of vaccination were of the lowest class. He suggested the omission of hospital isolation and the treatment of cases at home with vaccination of the contacts. At the present time in his district it was considered preferable to have a pleasant three weeks in hospital with small-pox than to suffer from vaccination at home. He believed that the mild type was a separate disease, and that even if it did change its type the occurrence of a few deaths would stimulate the demand for vaccination.

Dr. R. BRUCE LOW (Ministry of Health) thought the mild type was not so trivial, and was apt to be fatal to the newly born; he urged the need for stamping out the disease, and showed that the present failure was caused by the well-tried preventive methods not being properly enforced. He suggested that owing to the mildness of the disease the general practitioner regarded it with scorn; the cases were not promptly removed, the contacts were not followed up carefully, and there was no propagandism with regard to vaccination. He suggested that the mild type was more easily stamped out because it was less infectious, and that supervision of contacts should be extended from 16 to 20 days because the appearance of the rash was frequently delayed. To show that the mild type was no new thing he quoted from the letter of a doctor in 1722: "one type of small-pox the nurse cannot kill and one type the doctor cannot cure."

Sir MALCOLM WATSON (Malaya) showed how small-pox had been stamped out in the Malay States by efficient vaccination, and suggested the advisability of postponing vaccination till after the first year of life.

Dr. A. E. BRINDLEY (Derby) emphasised the large amount of concealment of the disease which went on.

Prof. HAROLD KERR (Newcastle-on-Tyne) said that contacts dreaded vaccination more than the disease, and hoped that it would be possible to reduce the virulence of the lymph even if it shortened the period of immunity. His town gave compensation to those who were laid off work owing to vaccination. He mentioned the case of seven painters who were exposed to infection and vaccinated. Three were off work, one of them for 11 weeks, and received their wages all the time. He did not agree with Dr. Garrow's proposal to leave the cases at home. The medical officer of health of a neighbouring district had refused to believe that the disease was small-pox. As a result infection spread to Newcastle and the consuls arranged for ships to be taken to other ports. In any ordinary big town the mild type of the disease could be controlled without difficulty.

Dr. R. M. F. PICKEN (Cardiff) said that better-class persons were also refusing vaccination. It was impossible to get efficient vaccination and revaccination against this mild type of the disease. Stunts for the vaccination of the whole population would only make us a laughing stock.

Diphtheria and Scarlet Fever.

Dr. R. A. O'BRIEN gave many instances to show how outbreaks of diphtheria could be prevented and controlled in resident schools and among hospital staffs, and went on to discuss some of the failures to apply our present knowledge. If antitoxin were given in the first 24 hours of the disease there would be no deaths from diphtheria. Statistics from the U.S.A. and from the reports of British medical officers of health showed that there was much delay of parents in calling in the doctor, much delay of doctors in making a diagnosis, further delay in waiting for the examination of the swab, and that frequently in the end an ineffective dose was given. Recent work showed that out of a thousand Schick-negative cases 97 per cent. remained negative after periods varying from one to seven years. Immunised persons who became Schick-positive rapidly regained their negativity with a Schick test. Three doses at intervals of one week was still the best method administratively, but it was possible to give the Schick test and the first immunisation dose simultaneously. Some persons became immune after the first dose and some after the second. Dr. O'Brien described the work which was going on for the purpose of improving our methods.

Dr. J. GRAHAM FORBES (London) described the progress which is being made in London and throughout the provinces in immunising the children at welfare centres and in the schools against diphtheria. Thirteen of the London boroughs have now provided such facilities, and some outside districts, such as Willesden and Tottenham. In addition to this, very satisfactory results had been obtained in many residential institutions and among the staffs of the M.A.B. hospitals. There was a considerable increase in this work during 1927 throughout the whole country.

Dr. B. A. I. PETERS (Bristol) described the very satisfactory results obtained in the immunisation of the hospital staffs of Bristol. They had found that the Schick test was not always reliable in the case of very virulent strains of diphtheria. They had now adopted for the hospital staffs immunisation without previous Schick testing. Their experience of immunisation against scarlet fever had also been satisfactory; he thought that all local authorities should adopt immunisation methods for their hospital staffs.

Dr. E. H. R. HARRIES (Birmingham) referred to the great value of surgical treatment of the naso-pharynx in reducing the number of "return" cases of scarlet fever and diphtheria. The examination of throat swabs as a method of testing the fitness of diphtheria patients for discharge was now being given up. Although scarlet fever was usually mild in the case of children it was not always so in the case of probationer nurses, and it was well worth while to protect them by immunisation. He said it was high time that more facilities were provided for the education of medical students in the fever hospitals. They should act as clinical clerks for, say, a month, instead of the present spasmodic visits. "Return" cases of scarlet fever could best be prevented by immunisation of the contacts in the home. In order to secure the success of these new methods it was very necessary to have the full coöperation of the general practitioners.

SECTION OF PUBLIC HEALTH.

THE TEACHING OF HYGIENE.

In opening this discussion, over which Dr. R. M. F. PICKEN (Cardiff) presided, Prof. W. W. JAMESON (London School of Hygiene) limited his remarks to the teaching of preventive medicine to medical students, and to the training of other members of the health services. General practitioners being in the first rank of health workers every effort must be made to arouse the preventive outlook among medical students. In this teaching mere sanitary engineering need not fill a large place; lectures for medical students should not be regarded as lectures by experts for the use of experts. Although the syllabus was much too wide at present it failed to deal with the sociological aspect. In the training of sanitary inspectors he attached great importance to experience as craftsmen in one of the building trades. There was a danger that such craftsmen might be kept out by the demand for too high a standard of general

education. He thought there should be more than one port of entry for health visitors, although he valued highly the training of a nurse. These should be probationary, and the salaries of health visitors proper should equal those of teachers in elementary schools. In the training of midwives a distinction should be made between those who intend to practise and those who are going to take up other health work. The principal midwifery schools should be reserved for the former, who should also have district training. For the latter a minor qualification, which might be termed "obstetric nurse," would suffice. Nurses who underwent training in a fever hospital were in an unsatisfactory position. If general hospitals accepted them subsequently they were treated as if their fever training had been of no account. Every trained nurse should have some fever training, and one year of her training might be devoted to this purpose. Health education in the schools should be carried out by teachers of the right type, and not by doctors or school medical officers. The teachers needed to be taught hygiene on more attractive and practical lines than at present. Many local authorities had not taken any interest in health education. He referred with approval to a syllabus drawn up by Dr. Brackenbury in 1904, when chairman of the Hornsey Education Committee, which, with minor alterations, had been in use ever since. Finally, they must get the general practitioner to take an interest in the education of the public. As regards broadcasting, he would prefer four-minute broadcasts on matters of special health interest at the particular moment, to the present 15 minutes health talks.

Dr. H. B. BRACKENBURY (chairman of B.M.A. Council) expressed himself in agreement with Dr. Jameson. The General Medical Council, he pointed out, has no direct power over the teaching bodies, but it can prescribe curricula and inspect examinations. It was impossible to coördinate the work of existing voluntary health education bodies, 100 in number. He thought that schools and general practitioners should be the most effective instruments of education. By educating the children they re-educated the parents. Education in sexual matters should only be given to older girls by head teachers or specially qualified teachers; it had been successfully done on these lines in Hornsey. There had hitherto been no attempt to deal with these questions in secondary schools. The question of mental hygiene had been neglected, and teachers needed instruction how to deal with mentally unstable and irritable children. He had not much faith in the benefits likely to accrue from public lectures or from the lectures of insurance practitioners to their patients. He would put first in importance the schools, second the day by day advice given by practitioners, and third the work of the health visitors in the homes.

Dr. D. LLEWELYN WILLIAMS (Welsh Board of Health) believed that the panel doctors had done much good since 1913, and were in a position to do good research into the beginnings of disease. They must secure a preventive outlook all through the medical curriculum. Birmingham had instituted lectures by panel doctors to their own patients, for which the insurance committee paid full fees. The results were claimed to be good.

Dr. BRACKENBURY intervened to say that the Representative Body was doing its best to encourage education by practitioners. A new household magazine was about to appear, and the Council of the Association had accepted the responsibility of supplying one page on health matters. The articles would be unsigned.

Dr. OLIVE WHEELER (Professor of Education, Cardiff) emphasised the importance of close coöperation between medical and educational bodies. For the teaching of hygiene in the secondary schools qualified biologists were needed; at present there were more females than males taking up biology among those trained. Some of the biological teaching must be practical—e.g., gardening. For the primary schools the teaching of hygiene is not living and imaginative enough; nature study should be correlated with hygiene and health practice. In their four years' course for teachers the fourth year was given up to the application of biology and other sciences. They also studied psychology and such questions as fatigue and development from a biological point of view. Practical teaching in physical exercises and the playing of healthy games was important. They had in Cardiff a "College adviser of games," who worked in close touch with the medical officer of health. It was too late to begin at the age of 5, and therefore nursery schools were needed for the teaching of habits.

Prof. HAROLD KERR (Newcastle-on-Tyne) thought much could be done to make the course of lectures in hygiene for medical students more interesting. He showed what a large amount of field work was included in the course given at Newcastle, and claimed that as a result the students who subsequently practised in the neighbourhood were his best supporters.

Mr. JAMES MACKENZIE (Secretary, Industrial Health Education Society) described how his society was getting in touch with workers in all occupations, and arranging medical lectures to such workers. The workers chose the subject, the medical officer of health helped to find the right lecturer, and "heckling" was encouraged. The workers were anxious for information about the many occupations inimical to health and life. In spite of huge expenditure on sick and medical benefits not a penny was spent on education under the Insurance Act.

Dr. ERNEST JONES (M.O.H., Cardiganshire) agreed that the teaching of hygiene had failed because the teachers had no knowledge of the sciences on which it was founded. Health knowledge would be a better name for the subject. He described the methods of teaching biology and physiology and their application to the students at Aberystwyth College. His suggestion that the clergy would benefit by a course of biology aroused applause. There was too much psychology and too little biology; they needed more science and less classics.

Mr. CREW (Sec., Central Health Education Council) favoured education by panel doctors. Ordinary public lectures did not reach the right people, and his society's experience of lectures by panel doctors was not very good. His society arranged successful medical lectures in the schools, and for the explanation of health films.

Mr. H. S. BOMPAS (Sec., Dental Board Health Campaigns) described what the Board did in the matter of organising dental lectures and supplying first-class apparatus free of charge. He found that local authorities sometimes had good schemes only on paper, and that teachers and health visitors knew the requirements of the district best. Some education committees had little enthusiasm. The Dental Board's films had been shown all over Northern Ireland, but they were not allowed in Scotland.

Prof. F. E. WYNNE pointed out that the public health lecturer could not choose the subjects which he thought best because he had to fit his students for an examination conducted by other examiners.

Dr. A. G. ROBB (Belfast Fever Hospitals) thought every nurse should spend some portion of her training in a fever hospital.

Dr. CARSTAIRS DOUGLAS (Anderson College, Glasgow) agreed that sanitary engineering figured too largely in the public health course.

Dr. C. F. L. LEIPOLDT (Cape Town) pointed out that there was no teaching with regard to the normal child in the medical curriculum, and that the qualified medical man had to learn by experience in the schools.

Dr. LETITIA FAIRFIELD urged that teaching should be practical, and Mrs. NEVILLE ROLFE drew attention to the failure to supply health education for the three million adolescents of the country.

SECTION OF THERAPEUTICS.

TREATMENT OF GASTRIC DISEASES.

Dr. A. F. HURST (New Lodge Clinic) opened a discussion on recent advances in treatment, remarking that he was himself unwilling to diagnose gastric or duodenal ulcer without direct X ray evidence, or to diagnose cancer of the stomach without evidence of occult blood in the stools. The fractional test-meal had also led to far more precise diagnosis. Dealing with the treatment of gastric ulcer, he said that the first factor to be dealt with was the acid factor, and this must be combated by diet and by such drugs as belladonna and alkalis. The second factor was that of focal sepsis; he doubted whether any ulcer could occur without such a factor. He stressed the importance of sinus infection and residual infection in the jaws of edentulous patients, to be found only by careful radiography. The other factors of importance were tobacco, worry, and fatigue. The latter factors necessitated treatment in bed. He showed by charts the effect of small feeds at frequent intervals in preventing the appearance of free HCl even when no alkali was given. Repeated X ray examination and search of the stools for occult blood were of value in demonstrating the progress of treatment. As regards after-treatment, he stressed the importance of an ulcer diathesis. Recurrences were usually due to a return to faulty habits, which must be prevented. Recent work had shown that bismuth salts were ineffective as alkalis whereas sodium citrate had high anti-acid powers; it was valuable in that its use involved no risk of alkalosis. Tribasic magnesium or calcium phosphate was also of great value and preferable to sodium bicarbonate and magnesium hydroxide. In conclusion Dr. Hurst spoke of the value of gastric lavage in pyloric obstruction; cicatricial obstruction was rare and would not result if the cases with spasmodic obstruction were rapidly treated. In chronic gastritis, associated with achlorhydria and excess of mucus, great improvement followed gastric lavage with hydrogen peroxide solutions.

Dr. T. IZOD BENNETT (London) said that it was perhaps difficult to speak of recent advances in the treatment of peptic ulcer at a time when the treatment adopted by many of the physicians chiefly interested in this subject had not yet been accepted by the professional in general, although such treatment had been successfully in vogue for ten years or more and had not been greatly modified during that period. He found that surgeons were inclined to condemn physicians merely because they were not magicians; the physician did not expect to cure except by the logical application of certain scientific principles over a period of time which must in some cases be somewhat lengthy. The essentials for successful treatment were, said Dr. Bennett, as follows:—

1. The removal of all sources of focal sepsis.
2. Prolonged and efficient arrest and neutralisation of gastric hyperacidity.
3. The reduction of peristaltic movements in the stomach and duodenum by an appropriate diet given at suitable intervals and so prescribed that the diet itself would exert a neutralising or adsorbing effect on acid.
4. The maintenance of active treatment during a period sufficient to secure permanent healing.
5. Prophylactic treatment aiming at the prevention of relapses.

All of these essentials were important and many of them were missing or insufficiently emphasised in treatments devised prior to that of the late Dr. Bertram Sippy. From a different point of view few of the treatments recommended were exactly on the lines of Sippy's because diets had to be devised to meet the requirements of patients of different nationalities. Prof. W. C. Alvarez, of Rochester, recently stated he had never seen a patient seeking relief for peptic ulcer who had, in his opinion, been efficiently treated prior to his first consultation with him, and it was a fact to-day, said Dr. Bennett, that the vast majority of patients coming under observation had never had treatment in which it could be claimed that the essentials outlined above had been carried out. Alkali is frequently given and almost invariably in insufficient dosage. Patients are treated for weeks and often undergo severe operations without important sources of oral sepsis ever being removed. It is an easy matter to relieve the pain for a patient with gastric or duodenal ulcer, in most cases by restricted diet and the administration of alkali, but unless such treatment is carefully planned and carried out for months after all symptoms have finished, relapse is almost sure to follow. In his opinion patients should be seen in consultation at regular intervals of three months or six months for a long time after they are apparently restored to full health, and at such consultations care should be taken to see that oral sepsis has been removed, that food likely to promote excessive peristalsis or hypersecretion is being avoided, and that large meals are never taken, reliance being placed on intermediate feeds to secure adequate nutrition. Proper attention to these points led to successful results.

Dr. J. H. ANDERSON (Ruthin) stressed the importance of coöperation with the patient. Three months was the minimum time for strict treatment; the first month should be in an institution; the second month as convalescence, and during the third a gradual return to work could be begun. After-treatment should go on for at least two years under supervision and consultation with his own doctor. The appendix was an additional source of infection and should be removed if necessary, but after-treatment should again be in the hands of a physician. Regarding diet he advocated a graduated diet beginning with olive oil and egg and milk at two-hourly intervals, boiled rice and pounded chicken being gradually added. By the twentieth day dry toast, steamed fish, custards, and milk puddings are given. At the end of the month a light bland diet with olive oil between meals is given. The rate at which the diet can be increased varies in individual cases and must be determined according to progress. Of alkalis he supported the use of magnesia salts, although the subject of the most suitable alkali was still being examined. He agreed with Dr. Izod Bennett as to the necessity of time to secure firm healing.

Dr. P. HAMILL (London) stressed the necessity of impressing on the patient the fact that his cure lay in his own hands. He felt that elaborate systems were bad because of the difficulty of applying them at home. He agreed with Dr. Hurst as to the value of sodium citrate. Ten grains of magnesium oxide would neutralise 10 oz. of gastric juice as secreted, 10 g. of magnesium carbonate or chalk, on the other hand, would only neutralise 4 oz., and bismuth was almost without effect. Citrates were valuable for avoiding the clotting of milk. The value of atropine in preventing spasm was to be remembered. It was remarkable how readily patients with gastric ulcer tolerated olive oil. A most important adjuvant to treatment was the use of blood transfusion in cases which had had severe hæmorrhage. Duodenal feeding was sometimes of great value in cases where obstinate pain and vomiting prevented adequate nutrition under oral administration.

Dr. A. P. CAWADIAS (London) emphasised the fact that focal infection was but one of many factors, amongst which constitutional factors in the endocrine system were equally important. He thought protein shock therapy was very valuable in alleviating pain and hastening healing.

The President, Dr. W. LANGDON BROWN (London), summing up the discussion, said that he felt the stomach was often more sinned against than sinning, being an organ essentially resistant to disease. He felt, however, that gastric ulcer was a disease which had become commoner without obvious cause. Rectal feeding had rightly fallen into disrepute. He felt that the Lenhartz diet had been a great advance in its day, but modern treatment recognised the importance of the individual patient's requirements. The importance of hydrochloric acid as a germicide was being more fully recognised, and the administration of this acid in cases of achlorhydria was of great

importance. He praised the work of Gibson and others in putting on a firmer basis our knowledge of the alkalis of real value. The pendulum was swinging against the tendency to operate hastily. Hæmorrhage was no longer an indication for operation before adequate medical treatment had been tried. He concluded by refuting the doctrine enunciated at the Cancer Conference that all ulcers should be excised on account of the risk of malignant change. The evidence was that gastric cancer almost invariably arose in cases where there was no sign of any previous disease of the stomach, and the public were already sufficiently alarmed about cancer without the introduction of such a bogy.

Dr. HURST, in reply, emphasised the importance of chronic gastritis as revealed by fractional gastric analysis. He briefly reviewed the results of surgical treatment of gastric ulcer; the mortality of gastrectomy in a famous hospital was 15 per cent.; the mortality of medical treatment was nil and there were practically no cases which could not be cured medically if proper care was given to them.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 11TH, 1928.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 114 (last week 111); scarlet fever, 1322; diphtheria, 813; enteric fever, 174; pneumonia, 592; puerperal fever, 45; puerperal pyrexia, 99; cerebro-spinal fever, 5; acute poliomyelitis, 14; acute polio-encephalitis, 1; encephalitis lethargica, 20; continued fever, 1; dysentery, 22; ophthalmia neonatorum, 132. No case of cholera, plague, or typhus fever was notified during the week.

The following counties each notified three or more cases of enteric fever:—London, 40; Devon, 6; Essex, 28 (of these 22 from Colchester); Kent, 9; Lancaster, 13; Middlesex, 7; Norfolk, 4; Southampton, 7; Surrey, 11; Warwick, 3; Yorks, West Riding, 5; City of York, 5. The total of 174 includes 85 cases of paratyphoid fever, of which 37 were notified in London and 6 in Surrey.

The number of patients in the Infectious Hospitals of the Metropolitan Asylums Board on August 21st–22nd was as follows:—Small-pox under treatment, 12; scarlet fever, 1542; diphtheria, 1553; enteric fever, 120; measles, 169; whooping-cough, 216; puerperal fever, 15 (plus 7 babies); encephalitis lethargica, 71; poliomyelitis, 2; "other diseases," 16. At St. Margaret's Hospital there were 19 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 7 (5) from enteric fever, 12 (1) from measles, 2 (0) from scarlet fever, 23 (4) from whooping-cough, 23 (6) from diphtheria, 72 (18) from diarrhœa and enteritis under two years, and 27 (5) from influenza. The figures in parentheses are those for London itself. The monthly statement of deaths from small-pox contains the information that no such death was returned for the month of July.

The fatal cases of enteric fever outside London were reported from Leyton and Rochdale. Of the 19 fatal cases of whooping-cough outside London 6 were reported from Birmingham while Glasgow reported the same number that week. Of deaths from diarrhœa Liverpool reported 11; no other town in England and Wales outside London more than 4, but Glasgow 7 and Dublin 8.

The number of stillbirths registered during the week was 299 in the great towns (corresponding to a rate of 40 per 1000 births), including 48 in London.

A REVOLVING OPEN-AIR HOUSE.—The West London Hospital at Hammersmith has been presented with a revolving open-air house which has been placed on the flat roof of one of the wings. It has been the practice to place convalescent children on the roof in settled weather, but the revolving house now enables them to take shelter in the event of rain. The house will hold from seven to ten children.

Special Articles.

VITAL STATISTICS OF ENGLAND AND WALES.

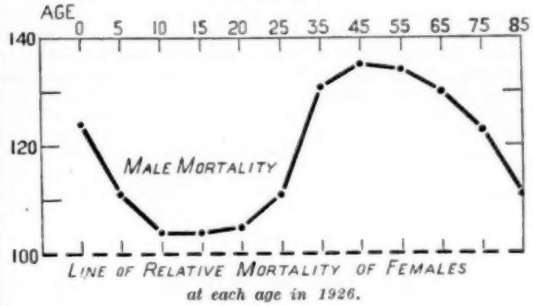
THE REGISTRAR-GENERAL'S REVIEW OF 1926.

THIS third of the volumes[1] in which the General Register Office now presents its annual statistical review is one which is, or at least ought to be, eagerly looked for by all medical officers of health and others interested in the incidence of disease. In fact, we fear it is read by few, and there can be no question that the public health service is the poorer by this default. The health officer who has studied this annual volume has increased his competence for his routine work year by year; he has had suggested to him problems for research which he can pursue; and his faith is fortified in the belief that for the pursuit of such researches there is not needed that knowledge of higher mathematical methods, fear concerning which has restrained timorous persons from inquiries of real public value. The present volume is perhaps the most interesting of a series of valuable medical reports which appear year by year; we can only hope to touch on a few points illustrative of the further riches waiting for extraction from a rich storehouse.

Progressive Ageing.

The progressive ageing of the English population is a phenomenon which it is difficult always to remember, although it has momentous bearing on our present and prospective vital history. The fact that the female

FIG. 1.



death-rate in England and Wales last year was only 10 per 1000 illustrates the importance of remembering that the steadily falling birth-rate is now meaning a relatively small proportion of children under 5, and will before long mean a larger proportion of persons over 55, whose death-rate is higher than that at intermediate ages. It is very easy to fall into the error that such a death-rate means an average duration of life for each person of 100 years. In truth, it only means a duration of about 59·6 years, owing to the facts just mentioned. Hence the necessity for the standardised death-rates used throughout this report, in which adjustments are made for these excesses of persons at certain ages, as compared with an arbitrary standard population.

Much interest attaches to the death-rates in the two sexes at different ages. In Fig. 1 these are shown graphically in relation to each other. Let the straight be the death-rate at such successive age-period for females. Then the upper curve gives the corresponding male death-rate. The curve of the male death-rate is profoundly interesting. At ages 0–5 the male is 24 per cent. in excess of the female death-rate, an

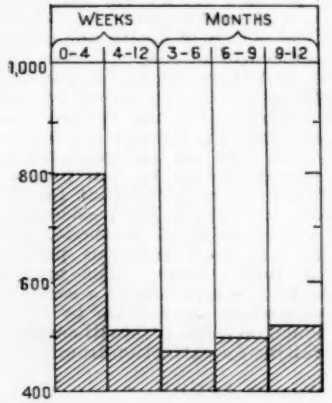
[1] The Registrar-General's Review of England and Wales, 1926, Text. 5s.

early female superiority of which no full explanation has been made. Between 10 and 25 the male inferiority is only some 4 or 5 per cent.; but at ages 45–55 the male death-rate is some 35 per cent. in excess of that of women. As old age approaches so do the death-rates for the two sexes come nearer together.

Infant Mortality.

The whole question of infant mortality is dealt with exhaustively, and the student will find here data bearing on every phase of this multiform problem. We can only draw attention to one point. This relates to the constantly reiterated statement that practically no progress has been made in securing a reduced death-rate during the first four weeks after live birth. The real facts are shown in Fig. 2. Comparing the average experience of 1906–10 with that of 1926, it will be seen that at this earlier period of "irreducible" mortality a reduction of over 20 per cent. has been experienced; while at the four subsequent divisions of the first year of life shown in the diagram a reduction of from 47 to 52 per cent. has occurred. It cannot be said that a 20 per cent. improvement is negligible; and with increased care of pregnancy, of childbirth, and of the lying-in period there is ample room for further improvement in this mortality of early infancy—in many parts of the country at all events.

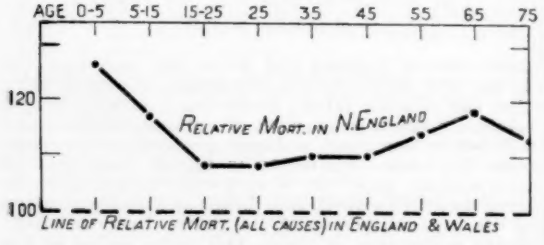
FIG. 2.



Relative infant mortality in 1926 as compared with that in 1906–10 taken as 1000 for five consecutive age-periods in infancy.

That this is so is further illustrated by Table X. on p. 12 of the Review. If the death-rate in the first month of life for England and Wales be stated as

FIG. 3.



100, it is highly significant that it is as high as 116 in the north of England and only 82 in the south! It is incredible that this difference between north and south is intrinsic and is not a difference in the degree of liberation from the barbarism of lack of skill or care.

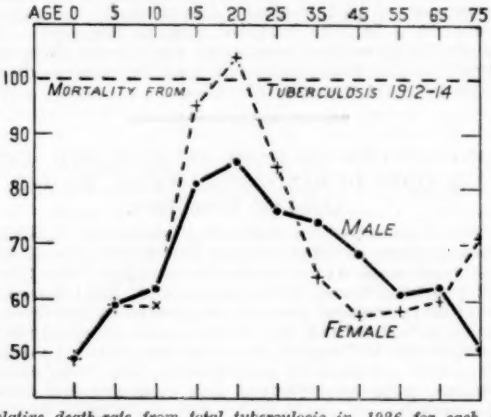
Total Death-rates North and South.

That this latter explanation holds is confirmed by the experience of north and south as regards total death-rate from all causes at successive periods of life. Fig. 3 shows the percentage excess of the northern areas of England over the average for England as a whole in the year 1926. This excess, which as shown in previous reviews, is not limited to industrial towns, calls for painstaking health inquiries in each northern community. The diagram contrasts the north with the whole of England. Evidently if north were contrasted with south the contrast would be even greater.

Tuberculosis.

The whole of this section of the Review should be studied by tuberculosis officers and others. The amount of improvement in the registered death-rate from total tuberculosis, when so recent a period as 1912–14 is compared with 1926, is shown in Fig. 4. Even after allowance has been made for the fact that the decrease of tuberculosis at ages 0–5 may be exaggerated owing to changes in nomenclature, the reduction shown at most ages is most striking. It will be noted that actual death-rates for each age-

FIG. 4.



Relative death-rate from total tuberculosis in 1926 for each sex and all age-periods compared with the corresponding rate for 1912–14 taken as 100.

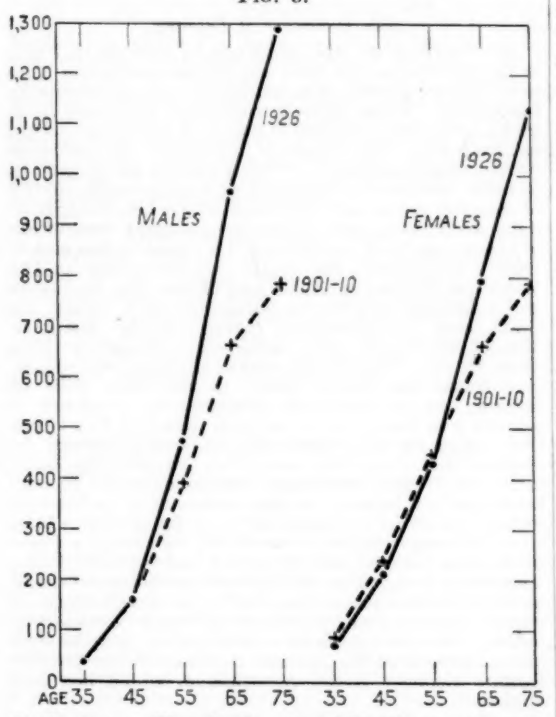
period are not shown in this diagram, but the percentage difference of the death-rate (male or female) in each age-period from that of 1912–14. For males it is seen that reduction has been experienced at all ages, and that even at the age-period 15–20 this decrease is 19 per cent., while at the age-period 20–25 it is 15 per cent. The smaller decrease at these ages than at other ages indicates a continuance of inimical influences which remain to be studied and removed. The course of the female relative death-rate brings out this point even more strikingly. At ages 15–20 the reduction in the tuberculosis death-rate is only 5 per cent. and at ages 20–25 it has actually increased by 4 per cent. It is impossible to avoid connecting this increase of the female death-rate in early adult life with the increasing migration into towns and the assumption of industrial and commercial in lieu of domestic life.

Cancer.

The section of the Review dealing with malignant disease is so important as almost to call for a special article. Doubtless this section of the report will be more eagerly scanned than any other, and it may be hoped that it will serve to temper and curtail the rash statements on the statistics of cancer which recur with monotonous inaccuracy. In view of the exaggerated statements as to increase of cancer Fig. 5 is very instructive. It is drawn from Table XLIII. on p. 64 of the Review. The age-distributed cancer death-rate at successive decades of life from 35 onwards for 1901–10 is compared with that of 1926, for males and females separately. Earlier ages are ignored, as the cancer death-rate is almost negligible prior to age 35. In both males and females an increased death-rate is shown, but this is practically limited to ages over 55 and does not become serious until the age of 65 is reached. This shows in the first instance the folly of writing about crude death-rates from cancer and the need for so-called standardisation. When this is done the

registered increase at all ages in male cancer between 1901–10 and 1926 is 30 per cent.; according to the crude death-rate it is 71 per cent. One must remain

FIG. 5.



Death-rates per million at each age-period 35–45 to 75 and upwards from cancer in the two sexes, 1901–10 being compared with 1926.

in some doubt as to the extent to which the increase in cancer at the higher ages is real, and the extent to which it is due to increased accuracy in diagnosis and especially to the greater frequency with which skilled autopsies are now made. In this connexion it may be noted that registered cancer mortality is highest in the denser centres of population, and as pointed out in the Review, the excess in urban centres is much greater for males than for females. It is well-known that the proportion of inaccessible growths, liable to escape recognition as cancer, is much higher for the male sex.

A noteworthy fact is that since 1913 there has been a practical absence of recorded increase of cancer for females, there being no increase of mortality from accessible growths and a comparatively slight rise for cancers in females of inaccessible sites. An important statement on p. 68 of the Registrar-General's Review is based on a revision of a former comparison made between cancer in accessible (easily diagnosable) and inaccessible parts of the body. In a preceding review such a comparison showed definite increase in accessible cancers, a result supporting the view of continuing increase in the death-rate from cancer. More recent returns, however, show that "for both sexes alike, there is no longer any evidence afforded by the comparison of accessible and inaccessible sites in favour of the reality of the recorded increase."

The interpretation of this result, which fits with observations made many years ago on the statistics of Frankfort-on-Main by King and Newsholme, is of course doubtful. It may mean that any apparent increase in inaccessible cancer is due to improved diagnosis; or, as pointed out in the Review, the facts are capable of an explanation of a totally different character. It may be that surgery has secured for the community a stationary position in the death-rate from "accessible" cancers which otherwise would have displayed a death-rate increasing like that of "inaccessible" cancers. Who shall decide? This opens up the great question as to the extent to which death certificates can be trusted to state

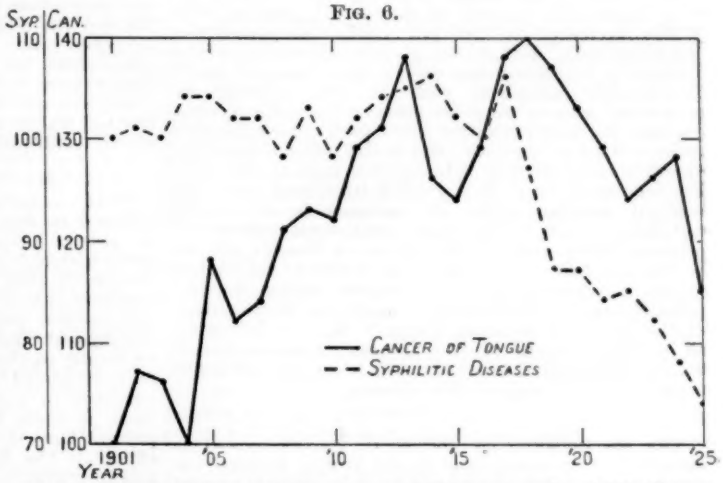
Death-rates from Cancer per Million Living.

Site of disease.	Males.	Females.
Lip, tongue, jaw	105	15
Pharynx and œsophagus	79	18
Stomach and liver	283	223
Intestinal (not rectum)	132	135
Rectum and anus	107	60
Uterus, ovary, vulva	—	206
Breast	2	184
All sites	1010	994

the localisation of the primary growth when death occurs from cancer. For instance, if several years after a successful operation for cancer of the tongue or mamma (i.e., successful in the sense of no recurrence in the same site) a patient dies of cancer of the liver or some other internal organ, in what proportion of such cases is the primary site of cancer stated in the death certificate? It is hoped that this is usually done, as it ought to be always; but is this view consistent with probabilities; and if not, what is the unknown margin of error? On the individual answer to this question must depend the weight attaching to consideration of death statistics for cancer of various sites. We regard as extremely important the statistics of localised cancer published in the Registrar-General's Review, and trust they will be continued, for every year they will tend to approximate more closely to the natural history of each certified death from cancer. Notwithstanding the inevitable doubt expressed above, Table XLV. on p. 69 of the Review is intensely interesting. In the table of death-rates from cancer we give an incomplete summary of its larger items.

The table, and still more the fuller table from which it has been extracted, is pregnant with suggestions

FIG. 6.



Relative (not actual) death-rates from cancer of the tongue and syphilitic diseases, the death-rate for each of these in the year 1900 being taken as 100.

for further research, and invites immediate speculation—which may lead to research—as to the causation of the extraordinary sex differences in the incidence of fatal cancer. Why this excess of cancer of the mouth in men? Is it due to their lower standard of oral hygiene? Is it due to smoking or to the drinking of strong alcoholic spirits, or to syphilis? To this point we return later. Does a similar explanation apply to the excessive male cancer mortality of the pharynx and stomach. Or do other indulgences of the table explain the difference? The possible relation of uterine cancer to avoidable traumatism in child-bearing necessarily arises, and the fact that mammary cancer is increasing unlike uterine cancer calls for separate investigation.

Preceding remarks have a bearing on a diagram on p. 72 of the Review displaying a most suggestive comparison between the course in recent years of mortality from cancer of the tongue and from syphilis. In Fig. 6 the course of the death-rate from cancer of the tongue and that for the death-rate from the diseases which collectively give a fair index of fatal syphilis in the community are compared. In each case we have reduced the death-rates to a relative amount, each death-rate being given in proportion to the initial item stated as 100. The earlier part of the cancer curve shows a rapid increase in the death-rate from cancer of the tongue without any evidence of relation to the syphilitic death-rate. This may or may not indicate increasing accuracy in certification of the original site of cancer, or it may or may not mean an actual increase of cancer of this site, or both. The second half of the two curves from 1914 onwards displays a suggestive parallelism, though the Review is most cautious in deprecating premature pronouncement on this point. The general course of the curves shows that with decreased syphilis has gone decreased cancer of the tongue (as certified in death-returns) and confirms the wide pathological impression that there is a causal relation between the injury produced by earlier syphilitic lesions and later cancerous changes. As pointed out in the Review, "decrease of syphilis is not the only influence making for decrease of lingual cancer known to have been operative during the last few years." Among other influences may be mentioned improved dental care.

The continuing increase in the death-rate recorded from cancer of the breast is intriguing. In 1901–10 it averaged 158, in 1911–20 it was 171, and in 1926 it had increased to 184 per million of population (standardised). But in the period under comparison operations on mammary cancer have become more drastic and complete, and the real increase in mammary cancer may be greater than the figures display, for two reasons: more patients completely recover than in the past, and if the interval between operation and recurrence in another part of the body has increased, there is a greater likelihood that the medical certifier omits the mamma in his death certificate. But, on the other hand, such omission of primary breast cancer when death is directly due to an internal cancer was even more likely in the earlier years of registration, as is clearly shown in the parallel case of the decline in mortality from cancer of the liver. Who shall decide? We are left with an increased sense of the necessary limitations of massed statistics of cause of death when one attempts refinements of localisation of disease.

THE RETIREMENT OF DR. E. C. THOMPSON.—The committee of management of Tyrone County Hospital has accepted, with regret, the resignation of Dr. Edward Charles Thompson, who was appointed surgeon to the hospital in March, 1875. He succeeded his father, who had held the appointment for 40 years, making a total, for father and son, of 93 years' service. Dr. Thompson, who early in life received the Albert Medal and the St. John's Medal for bravery in saving life on land, sat in Parliament as a Constitutional Nationalist for North Monaghan from 1900 to 1906. He was formerly President of the North of Ireland Branch of the British Medical Association.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

The Incidence of Leprosy.

KNOWLEDGE of the incidence of leprosy in India is dependent on the 1921 census figures which were collected by untrained enumerators and are avowedly inaccurate. These figures, while they give very little idea of the total number of lepers in India, are useful as indicating the relative incidence in different provinces and districts. With a view to the collection of more accurate information an experimental survey of selected areas was instituted which has brought to light such facts and figures as to carry conviction of the necessity of continuing it at least to the end of 1928. The survey was begun experimentally in the Manbhum district of Bihar and Orissa, the Manbazar and Raghunathpur *thanas* being surveyed. Then the Onda and Gangajalghati *thanas* of the Bankura district of Bengal were surveyed; thereafter three areas in the Sonthal Parganas, and the end of the year found the survey party in the Chin Hills of Burma. In the first three districts the incidence of leprosy was found to be between four and five times that given by the census figures, but it cannot be claimed that even this survey has revealed the total incidence. The important advance made in the treatment of leprosy is the adoption of potassium iodide, the effect of which has been known for a long time, although the reactions caused by ordinary doses in the best known types of leprosy had led to its being considered dangerous. Clinical and pathological study at the Calcutta School has led to a classification of certain types and phases of leprosy which benefit from iodide. The full significance of the survey may be seen in the report of the Indian Council of the British Empire Leprosy Relief Association, which has just appeared.

Street Watering and Disease.

A prominent public health authority has again drawn attention to the dangers associated with the indiscriminate use of unfiltered water for spraying the streets of Calcutta. The water that is used for spraying is drawn from the most polluted portion of the river; it is practically raw sewage. When the silt that is thrown on the streets along with the water is nearly dry, and before it is sterilised by the sun, it is scattered all over the city by the wind. The dust teems with microbes and is undoubtedly a potent cause of eye, throat, ear, and nose ailments in the city. It is also responsible for many cases of septic pneumonia. Until the unfiltered water-supply is stopped and only filtered water used Calcutta will remain a city in which respiratory complaints flourish.

Malaria Problem in Bombay City.

That malaria has become much more widely diffused in Bombay within the last 15 years is the keynote of a report presented recently by the Government malariologist to the Bombay Corporation. The disease is still prevalent to a serious extent in the southern part of the city, due chiefly to the presence of unprotected wells; but the most intense malaria at the present time is in the vicinity of the mills, more especially in the Worli section. In certain areas from 30 to 70 per cent. of the children examined have shown evidence of malarial infection. It is possible that there is more endemic malaria in Bombay at the present time than there was in 1911. Apart from its effect on the health of the population and on the infant mortality of the city, the disease is the cause of very heavy financial loss to the city. There is no natural malaria in Bombay, the chief reason being the absence of natural streams. The cause of its prevalence in the city is the presence of thousands of permanent breeding-places artificially produced by man, the most important of which are wells, cisterns, fountains, tanks, water used in building construction, leakages from reservoirs, water-pipes, and cellars into

which subsoil water percolates. Preventive measures have hitherto failed owing to lack of a unified control in antimalarial operations.

Pasteur Institute at Kasauli.

The Government of India has recognised the value of the work done by the Pasteur Institute of India at Kasauli in offering a grant of Rs.1,14,500 towards non-recurring expenditure besides increasing the annual grant by Rs.10,000. To this offer, however, was attached a provision that this financial help would be given only in case the Institute raised an equivalent amount from other sources, which may be a difficult task. In the meantime rebuilding is urgent. The Maharajah of Dholpur has offered Rs.12,000 towards the provision of electric lighting.

Daylight Saving in Burma.

Among the items for discussion at the forthcoming session of the Burma Legislative Council is the Daylight Saving Bill, which is unique in India. The proposal is similar to the Summer Time Act in England —namely, that from Sept. 1st until April 1st all clocks should be advanced an hour and all business carried on according to the new time.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

The Medical Civil Service.

THE standards of the public health service in American municipalities still leave much to be desired. In a recent survey made by a committee of the American Public Health Association it was found that among 1281 State, county, and city health officers, listed by the U.S. Public Health Service up to the beginning of this year, only 29 had a degree in public health. In 1926 only 104 degrees in public health were granted in our Universities, whereas it has been estimated that the needs of the country as a whole require that 570 health officers should be trained each year. It is obvious that men are not attracted by the profession. Probably the outstanding reason for this is the insecurity of tenure of public health office. It will be remembered how the president of the association recently lost his office in Chicago on purely political grounds. In 156 cities investigated it was found that in less than 20 per cent. was the office regulated by civil service. About one-quarter of these cities appoint their health officers for a term of not more than two years, less than half of them make the appointment "indefinite, or at the pleasure of the appointing body." As a result of these conditions applicants must either be excessively devoted to public service or very badly in need of employment before they are willing to accept office.

Criticism of the B.C.G. Vaccine.

S. A. Petroff and Arnold Branch, of the Trudeau Sanatorium, as a result of a very thorough search of the literature and of their own laboratory experiments with B.C.G. vaccine, come to the conclusion that "watchful waiting is the best position at present in reference to the vaccination of infants." Contrary to the findings of many European workers, these American workers do not find the vaccine constantly innocuous to small laboratory animals. In two instances they were able to demonstrate generalised tuberculosis by direct inoculation into guinea-pigs and in one other instance tuberculosis was established after the second animal passage. Noticing that when B.C.G. was grown on fluid media there appeared two types of colonies, the Trudeau workers became suspicious of the existence of variants similar to those observed in the reproduction of other acid-fast organisms. A small amount of culture received directly from Calmette was triturated in salt solution, filtered through two layers of Whatman paper No. 5, and plated on a gentian-violet medium. After six weeks there appeared two morphologically distinct types of colonies. A comprehensive study of the biology of these two types is to be published shortly. Suffice it to report here that while the type christened "R" always produces some tubercles which in time heal, the type they have named "S" invariably produces progressive disease terminating in the death of the guinea-pig. As regards the reports of successful infant inoculation in Europe they criticise especially the lack of adequate control. They would like to see a series of thoroughly controlled experiments in cattle and on a large scale.

International Congress of Mental Hygiene.

The first International Congress of Mental Hygiene, it is announced, will be held in Washington in the spring of 1930. The meeting was to have been held in 1929, but has been postponed in order to secure greater coöperation with psychiatric associations in this country. It is believed at present that a large and representative attendance of American psychiatrists is now assured. Information on the progress of the plans for the conference may be had by writing to the general secretary, Mr. Clifford W. Beers, 370, Seventh Avenue, New York City.

Small-pox in 1927.

For the fifth year in succession the United States reported more small-pox cases than any other country except India, a total of 38,498 cases for 1927 as against 33,343 cases in 1926. There were, however, only 135 deaths. The New York State Department of Health has been commendably thorough in obtaining vaccination histories for every one of the 368 cases reported in their jurisdiction. Analysis shows that not a single case occurred among those vaccinated successfully during the last seven years; 31 cases occurred among those vaccinated more than seven years previously, and the remaining 337 among individuals who have never been successfully vaccinated.

The Ethics of Pay Clinics.

The Medical Society of the County of New York recently appointed a special committee to inquire into the relation between the pay clinic (for people able to contribute towards the cost of the service rendered) of Cornell University and the practising members of the profession. The committee reports in part as follows:—

1. The welfare of the public must be the first consideration of a medical problem, the economic difficulties of the physician being of secondary importance. 2. The Cornell Pay Clinic was a decided departure from the prevailing type of dispensary: (*a*) in that an attempt was made to charge fees that would make the clinic self-supporting; (*b*) in that a diagnostic group clinic was formed for persons of moderate means. 3. There is at present in New York no other dispensary which excludes the indigent poor and to which the person of moderate means may go and have a thorough diagnostic study within his capacity to pay. Less than 20 per cent. of the work of the Cornell Pay Clinic is diagnostic. Over 80 per cent. is devoted to the routine treatment of patients. The clinic is thus in active competition with physicians who earn their living.

The committee concludes that the Cornell Clinic does not actually violate any State law; it does not object to Cornell holding a diagnostic clinic for teaching purposes, provided such a clinic is subsidised by the University, but it is opposed on principle to pay clinics for treatment under all circumstances. Counsel for the Society is instructed to investigate the legal aspects of the situation more thoroughly.

Rocky Mountain Spotted Fever.

Recent investigations into the ætiology and prevention of this disease were reported by Dr. R. R. Parker, of the U.S. Public Health Service, to the Fourth International Congress of Entomology now being held at Ithica, New York. There is a remarkable variation in the case-mortality of this tick-borne disease. In some parts of Montana the fatalities amount to 90 per cent. of the case-incidence,

whereas in the neighbouring State of Idaho the case-mortality has been no higher than 5 per cent. During the last few months, however, the use of a serum has been definitely effective in cutting down the death-rate.

THE GERMAN SICKNESS INSURANCE SYSTEM.*

THIS volume, the latest addition to the valuable series of publications issued by the International Labour Office on the subject of national health insurance, fully maintains the high standard set by its predecessors. It is evidently the fruit of much study and reflection and should be found useful by those who in other countries are grappling with the various problems of sickness insurance. Hitherto the recent experience of compulsory insurance against sickness in the land of its origin has been almost inaccessible to English readers who do not read German, for the two leading books in English on the subject, Mr. Dawson's "Social Insurance in Germany" and Mr. Gibbon's "Medical Benefit in Germany and Denmark," were published in 1912, and much has happened to the German insurance system within the past 16 years. To English readers, therefore, this book makes an especially welcome appearance.

Compulsory insurance against sickness on a national scale in Germany dates from June, 1883, although the principle of compulsion had already been introduced in various parts of the Empire; in Prussia miners had been compulsorily insured since 1854. At first the national scheme applied only to persons employed in certain named occupations, but others were added from time to time, especially by the important Act of 1911, which brought agricultural labourers and domestic servants within the scheme. At the present time the number of insured persons is rather more than 20,000,000, or nearly one-third of the total population. In Germany, insurance is compulsory not only against sickness, but also against invalidity and old age, and against industrial accidents (workmen's compensation). Each of these three forms of insurance is administered by a separate body of organisations; sickness insurance by the sickness funds (*Krankenkassen*), which are self-governing associations of insured persons and contributing employers; invalidity and old age insurance by the local insurance authorities, which are bureaucratic institutions with some representation of insured persons and employers; and accident insurance, to which the employees do not contribute, by mutual associations of employers. Moreover, sickness insurance is not regulated by a single code as in this country; there is a separate body of law for wage-earners, and another for salaried employees, while miners are insured under special Acts which provide a single system of sickness, invalidity, and old age insurance. The whole subject is exceedingly complex and difficult to understand, and Dr. Goldmann and Dr. Grotjahn are to be congratulated on the very considerable measure of success they have achieved in explaining it to the general reader.

Tendencies of Sickness Insurance.

Compulsory sickness insurance appears everywhere to develop on certain broad lines, which may most profitably be studied in Germany, where insurance on a compulsory basis has existed longer than in other countries. First, the proportion of the total population coming under insurance tends continually to increase, partly by the inclusion of additional occupations, but chiefly by the extension of insurance benefits to the dependents of the insured persons. This extension has made great progress in Germany since the war, and it is now estimated that in addition to the 20 million insured persons there are nearly 19 million dependents for whom benefits are available under the sickness insurance system, the total number forming more than three-fifths of the whole population. Secondly, cash benefits have become relatively less important than benefits in kind—medical treatment, &c. Experience has shown that it is more economical to provide the treatment necessary to restore working capacity than to provide the disabled worker with money to use at his own discretion. Consequently, the range of treatment provided by the sickness funds has greatly increased. Thirdly, a rapidly increasing activity is being displayed in the field of prevention.

Range of Treatment.

Treatment is given on a scale that is surprising to the English reader. The insured person in Germany is not only entitled to the services of a general practitioner, as in this country, but he has also provided for him the whole range of modern therapeutic measures—specialist services, including electro-physical, balneological, and orthopædic treatment, and treatment and maintenance in sanatoriums and other residential institutions. Treatment may be given by arrangement between the sickness fund and outside institutions, but in many cases the funds make direct provision in their own institutions. The General Local Sickness Fund of Hamburg has four institutes for artificial sunlight therapy and a large orthopædic institute for making appliances, where in 1925 there were made 5424 trusses, 16,305 flat-foot supports, 3352 abdominal belts, and nearly 18,000 other articles. In 1924 no less than 19,906 X ray examinations were made in the institute of the Association of Berlin Sickness Funds, and 13,715 in the Institute of the Dresden Local Sickness Fund. Diagnostic facilities are provided on a large scale. The Institute of the Association of the Berlin Sickness Funds contains chemical, pathological, bacteriological, and serological departments, and makes between 5000 and 6000 examinations monthly. In 1924 it was consulted by about 3000 insurance doctors in Berlin. In-patient hospital treatment is usually provided by arrangement with institutions established by the communes or voluntary organisations, but some funds have established hospitals of their own; the miners' funds have 21 hospitals with 3970 beds.

Dental treatment is given on a rapidly increasing scale. There are some 8000 dentists in Germany, and about 6000 are employed by the sickness funds. The average expenditure on dental treatment per member by the funds rose from M.0·50 in 1914 to M.2·35 in 1925. In the Hamburg funds the average expenditure in the latter year was M.3·72 per member.

Preventive Work of the Sickness Funds.

In recent years there has been a remarkable development of the preventive side of sickness insurance. For instance, special attention is given to maternity and child welfare. The statutory maternity benefits, which are provided for both insured and their dependents, include (1) attendance by a midwife, and, if necessary, medical attendance; (2) a lump sum payment of M.10; (3) a weekly payment during the four weeks preceding and the six weeks following confinement; and (4) an additional weekly cash payment during 12 weeks after confinement to those mothers who nurse their babies. The funds contribute to the communal maternity and child welfare centres, and some have established centres of their own, which are widely consulted; the centre of the Erfurt Sickness Fund is consulted by nearly 80 per cent. of the mothers of the area. Dr. Goldmann and Dr. Grotjahn think that the effort put forth in this direction is still inadequate, but there seems no doubt that an enormous amount of good work is being

* Benefits of the German Sickness Insurance System. By Franz Goldmann, M.D., and Alfred Grotjahn, M.D. International Labour Office. Studies and Reports, Series M (Social Insurance), No. 8. Published in the United Kingdom for the International Labour Office by P. S. King and Son. 1928. Pp. 188. 4s.

done. The funds participate in welfare work among school-children, they contribute towards the provision of country homes, forest schools, open-air baths, games, &c. Some funds maintain their own country institutions; the Sonneberg Fund has its own forest school, where the children have facilities for sun baths, swimming, gymnastics, &c. Contributions are made towards school meals; in 1925 the Cologne Funds contributed 45 per cent. of the cost of the meals provided by the municipality for school-children. Many funds provide orthopædic gymnastics for the children of the members.

In the antituberculosis campaign the lead, so far as the insurance organisations are concerned, has been taken by the invalidity insurance institutions, but the sickness funds are now taking an active part in the work. The facilities they afford for free medical examination, with various kinds of specialist assistance, tend to the early detection of the disease, and the sick visitors of the funds encourage the members to seek medical advice when disease is suspected. The funds contribute largely to the maintenance of sanatoriums and dispensaries and some have established institutions of their own. What is regarded as an important health measure, especially in this connexion, is the provision of convalescent treatment and recuperation in country convalescent and holiday homes, forest camps, &c., particularly for young workers newly exposed to the stress of economic employment. The funds participate in the anti-alcohol and antivenereal movements, and a system of compulsory notification of venereal disease, with supervision of the patients, has been instituted by a number of the funds. Much health propaganda is carried out by such means as the distribution of pamphlets and periodicals, the organisation of lectures, health exhibitions, films, plays, &c. The Central Union of German Sickness Funds publishes a monthly health journal which has a circulation of nearly half a million. The first German "Health Week" was organised jointly in 1925 by the municipality of Berlin and the sickness funds, and this was followed in 1926 by a "National Health Week" largely owing to the efforts of the funds.

The Sickness Funds and the Medical Profession.

The extensive range of the medical services provided by the sickness funds brings them into close relation with the great body of the medical profession in Germany. It is estimated that about 30,000 doctors, or 80 per cent. of the whole profession, work for the funds, and that for the great majority this work forms the chief source of their income. Dr. Goldmann and Dr. Grotjahn estimate that more than half of all incomes from medical practices in Germany is derived from sickness insurance. The system of employment of doctors and the methods and amount of remuneration differ widely amongst the various funds, but the system of free choice of doctor, which is one of the basic demands of the profession, appears to be making headway. Before 1923 the funds were practically autonomous in making arrangements with the doctors, but in that year provisions were introduced into the Federal Insurance Code to regulate the doctors' contracts, so that certain conditions of service are common to the whole country. The funds, however, still possess a considerable measure of autonomy.

Some Criticisms of the German System.

The German sickness insurance system is a wonderful achievement in the field of social reform, but as the authors of this volume do not hesitate to point out, it is by no means free from defects. The work of the funds appears to be imperfectly coördinated with the health work of other agencies and there is much overlapping and duplication of effort, which could be avoided by improvements in organisation. Again, the system has not succeeded in attaining the vitally important object of securing harmonious relations between the administrative bodies and the medical profession, and our authors think that no real improvement may be expected until something like the British system is adopted under which the local arrangements with the doctors are made by an insurance committee on which the local medical profession is represented.

The utility of this volume to the foreign reader would have been enhanced if the authors had included a preliminary account of the general framework of the German social insurance system, explaining the organisation of the different agencies concerned in the various forms of insurance, their relation to each other and to the local authorities and the State. Certain technical terms—e.g., "basic wage"—might usefully have been defined and explained and the statistics brought to a later date than 1925, when for the most part they end. And the medical reader would have welcomed fuller information on the subject of the relation of the funds to the doctors, the nature of the problems that have arisen in that connexion, and the progress that is being made towards their solution. These, however, are but minor criticisms of an important work of sterling value and utility.

MEDICINE AND THE LAW.

Dangerous Drugs Legislation.

THE *London Gazette* of August 17th gave notice that the Dangerous Drugs Act of 1925 will come into force on Sept. 25th, 1928, that being the date when the International Opium Covention signed at Geneva in February, 1925, begins to operate. The notification will recall to our readers the abrupt termination of the proceedings against Colonel Kynaston, when counsel for the Crown admitted in the Court of Criminal Appeal that the Act of 1925 (cited, possibly unnecessarily, in the framing of the charges in that case) was not yet operative. The proceedings consequently resembled, as the Lord Chief Justice remarked, the pulling of a bell-rope when there was no bell at the other end. The Geneva Convention of 1925 provided (by Article 8) that, if the Health Committee of the League of Nations, after having submitted the question for advice and report to the Permanent Committee of the Office International d'Hygiène Publique in Paris, found that any preparation containing any of the narcotics referred to in Chapter III. of the Convention—i.e., drugs to which Part III. of our Dangerous Drugs Act, 1920, as amended, applies—could not give rise to the drug habit on account of the medicaments with which those narcotics are compounded and which in practice preclude the recovery of the said drugs, then the Health Committee should communicate the finding to the parties to the Convention and thereupon the provisions of the Convention should not apply to the preparation concerned. Our 1925 Act was passed to give effect to the Geneva Convention. The resultant changes in our dangerous drugs legislation are these: Part I. of our Dangerous Drugs Act of 1920 (regulating dealings in raw opium and restricting its import and export) is extended to coca leaves, Indian hemp, and resins obtained from Indian hemp, and all preparations of which such resins form the base. "Coca leaves" and "Indian hemp" are specially defined. Section 2 of the 1920 Act enacted that nobody should export raw opium from the United Kingdom except under licence and from approved ports, *and except in packages marked in the prescribed manner with an indication of the contents thereof.* The italicised words now cease to have effect. The 1925 Act also substitutes a new definition of the drugs to which Part III. of the 1920 Act applies, and a new definition of "medicinal opium." Finally, it authorises the making of Orders in Council excluding preparations from Part III. of the 1920 Act where there has been a finding under Article 8 of the Geneva Convention as already described.

Another notification in the same *Gazette* announces that Part III. of the Act of 1920 is henceforth to apply to benzoyl-morphine, dihydro-oxycodeinone, dihydrocodeinone, and their respective salts, and to any preparation, admixture, and extract containing benzoyl-morphine, dihydro-oxycodeinone, and dihydrocodeinone. This Order in Council is made under Section 8 Subsection (2) of the 1920 Act, whereby His Majesty may apply Part III. to any drug whatever, if it appears that such drug is or is likely to be productive, if improperly used, of ill-effects substantially like those produced by morphine or cocaine.

TUBERCULOSIS IN IRELAND.

(FROM OUR OWN CORRESPONDENT.)

SOME of the communications made to the Congress of the Royal Institute of Public Health held recently in Dublin give interesting information on the subject of tuberculosis in the Irish Free State. Sir William Thompson, formerly Registrar-General of Ireland, showed slides exhibiting the death-rates from tuberculosis in England and Wales, Scotland, and Ireland from 1904 to 1926. The rate for England and Wales had decreased from 1·75 per 1000 living in 1904 to 0·95 in 1926; for Scotland from 2·25 to 1·00; and in Ireland from 2·85 to 1·45. In 1912 tuberculosis came first on the list of causes of death in Ireland with 9400 deaths; in 1926 it came fourth with a little under 7200 deaths. It was generally agreed, Sir William added, that there were eight people suffering from tuberculosis for each death, and one might conclude, therefore, that there were some 16,000 fewer people suffering from tuberculosis than in 1912. Somewhat different figures were given by Mr. E. P. McCarron, Secretary of the Department of Local Government and Public Health. Contrasting the years 1912 and 1927, he found that in the area now comprised in the Irish Free State the number of deaths from tuberculosis in 1912 exceeded those in 1927 by 2600. If both writers are correct then there would appear to be a slight increase in the number of deaths in the area of Northern Ireland. Mr. McCarron added that in respect of the operation during last year of 19 of the approved tuberculosis schemes in the Irish Free State, 1536 tuberculous patients were made fit to resume their ordinary life. He gave these figures as an illustration of the value of wise expenditure in the preservation of the public health. "The blunderer with an axe at public expenditure was a menace to all that was best in our civilisation."

Mr. J. H. Norris, Director of Veterinary Research, Department of Lands and Agriculture, Irish Free State, gave valuable information as to the extent of tuberculosis among cattle in the Irish Free State. There were, he said, no complete or even extensive statistics bearing on the incidence of tuberculosis in dairy cattle in the Irish Free State, but from results of tuberculin tests carried out in various herds it might be assumed that at least 20 per cent. were tuberculous. This evidence was supported by separate statistics kept at the Dublin abattoir. During 1926 23·69 per cent. of cows slaughtered were found to be tuberculous, but of these only 3·17 per cent. showed lesions extensive enough to call for total destruction of the carcass. Only 6·52 of bullocks and 5·59 of heifers were found affected. For some time past mixed samples of milk from herds in various parts of the country had been examined at the Department of Agriculture's veterinary laboratory. Up to June 30th last 391 samples from different herds, containing 3884 cows, or an average of 10 cows in each herd, had been dealt with. All samples, in addition to microscopic examination, were submitted to the biological test, with the result that 18, or 4·60 per cent., were found to contain tubercle bacilli. Positive cases were followed up and dealt with under the Tuberculosis Order.

Correspondence.

"Audi alteram partem."

SMOOTH AND ROUGH VARIANTS OF BACTERIA.

To the Editor of THE LANCET.

SIR,—On the whole I concur in Dr. Arkwright's criticisms, in THE LANCET of August 11th, of my letter in the previous number. Especially would I support him in the quest for biological generalisations, without which clear thinking becomes impossible. I therefore deeply regret my letter conveyed any impression to the contrary. Moreover, the exceptions to such "laws" are of prime importance since they often furnish a clue to the relationships between bacterial races. Doubtless, also, it would lead to less confusion had the terms "rough" and "smooth" been reserved for the contrasted antigenic and other characters as originally described by Dr. Arkwright. Unfortunately, smooth and rough are everyday words, which so aptly point the antithesis between two widely distributed types of colony appearance and consistence that it is difficult to resist using them for this purpose. The strains of parasites termed *C. diphtheriæ* in my letter, were, in the vast majority of cases, isolated from separate hosts, or the same host at different times; only a few strains were derived from a common parent strain during their laboratory existence. Surgeon-Commander Parker only describes the laboratory side of the investigations referred to. The work was an attempt to find out what variations took place in certain "non-specific" characters of a group of bacteria all of which had enough "specific" characters to satisfy my concept of *C. diphtheriæ*. The results indicated that during their existence in their natural habitat, the human throat, this group varied widely in composition at different times and places. As Dr. Arkwright truly points out, any value this work may have depends on the meaning given to *C. diphtheriæ*. Perhaps a brief attempt to explain what I do mean may to a slight extent indicate the relationship between the species-concept and variation as applied to bacteria. I believe it to be unwise at the present time to define too rigidly any bacterial species. As a working hypothesis an organism must have certain stable and definite criteria before it is assigned to a "conventional type species." As facts accumulate it may be found advisable to add or subtract criteria from these which determine the "type species," in order to exclude or include certain strains of bacteria. For example, in the Greenwich investigations a bacterium had to possess the following attributes before it was diagnosed as *C. diphtheriæ*. The organism must ferment glucose but not saccharose, grow aerobically on congulated serum without liquefying it, and form non-chromogenic colonies. Smears from cultures of suitable age on solid serum had to show Gram-positive, Neisser-positive, pleomorphic bacilli. It is evident, from Dr. Arkwright's letter, that although I *feel* that the above definition is the most practicable to work round, yet he *feels* some reference to toxin production is essential in order to identify an organism with *C. diphtheriæ*—i.e., should a culture of an organism, otherwise qualified for inclusion in the species, produce no diphtheria toxin, it must be known that its ancestors were toxigenic before it can be named *C. diphtheriæ*. It may be taken as now definitely established that many toxigenic races of *C. diphtheriæ* are able to throw off avirulent variants. Before this was generally accepted, many bacteriologists considered that *all* avirulent bacilli were species distinct from virulent diphtheria bacilli. Such an opinion is no longer tenable, and even if there should be "pure lines" of bacilli, possessing the criteria given above, whose ancestors never have and whose

descendants never will produce diphtheria toxin, there is no means, so far as I know, of distinguishing them from other races similar in all respects except that their recent ancestors were known to have been toxigenic—i.e., to have possessed a different antigenic make up. As the word indicates, antigenic characters in a parasite imply reactions in the host and hence are of paramount importance in medicine. In spite of this fact, it is debatable if antigenic qualities are in general sufficiently stable for differentiation of "species," however useful they may be in describing subspecies, types, races, varieties, and special strains within the species.

For these reasons I personally dislike including any reference to toxigenicity in the description of *C. diphtheriæ* as a "species"; but the subject is full of difficulties of which this correspondence is only able to give a hint. However, Dr. Arkwright's letter illustrates clearly one point of practical importance—that, until there is a universally used standard bacterial nomenclature, where an author refers to a subdivision of the bacteria, he must take care that it is possible for others to understand exactly what he means. I plead guilty to not having done so in my previous letter.

I am, Sir, yours faithfully,

SHELDON F. DUDLEY.

Royal Naval College, Greenwich, S.E., August 11th, 1928.

PAPWORTH COLONY AND SANATORIUM TREATMENT.

To the Editor of THE LANCET.

SIR,—Several daily papers represented at the recent Dublin Congress have been devoting leading articles to the above; and, so far as they help Dr. Varrier-Jones's cause, they will do nothing but good. Unfortunately, however, they give the impression that sanatorium treatment has been a failure, a statement which is at most a half-truth, and much to be deplored.

The immediate results of sanatorium treatment are surprisingly good; favourable cases are restored to health, and many unfavourable ones are much improved. In the most favourable, the good results are permanent; but, unfortunately, four-fifths of those applying for treatment have already passed the most favourable stage, or for other reasons are not likely to make a complete recovery, whatever the treatment. In such cases the results of sanatorium treatment are conditional, and relapses happen if the quarters are unsatisfactory, the conditions of life are unhealthy, or the rules learnt in the sanatorium forgotten or ignored. To blame the methods of treatment because the after-conditions are not satisfied is not logical. One of these after-conditions is the possibility of earning an adequate wage under healthy conditions. Another is to permit of rest in the open-air if symptoms arise which call for it. It is a great merit of Dr. Varrier-Jones's arrangements at Papworth that these three essentials are provided. His methods are not a substitute for sanatorium methods (for there is no substitute), but they are a valuable extension. Many of his inmates have had some treatment in a sanatorium; and any of them receives a similar treatment in the colony whenever he needs it.

From the earliest days of sanatorium propaganda it was clearly stated that the sanatorium is only one link—though an essential one—in the chain of treatment. So long as the fear of infection prevents the sanatorium patient from obtaining remunerative employment under suitable conditions, the need for colonies like Papworth, or for special workshops as advocated by the late Dr. F. S. Tinker, will be urgent; but they are not, and cannot be, a substitute for the sanatorium, which combines advantages in the same way as a hospital for other ailments.

I am, Sir, yours faithfully,

F. R. WALTERS.

Farnham, Surrey, August 25th, 1928.

THE LATER RESULTS OF PARTIAL GASTRECTOMY FOR GASTRIC AND DUODENAL ULCER.

To the Editor of THE LANCET.

SIR,—A study of the figures relating to chronic gastric and duodenal ulcer given by Mr. Norman Lake in his paper on the "Later Results of Partial Gastrectomy" in THE LANCET of August 11th shows that (1) gastro-enterostomy was *unsatisfactory in 36 per cent.* of 61 cases, but there was no mortality; (2) partial gastrectomy was unsatisfactory in only 2·5 per cent. of 51 cases, but there was a *mortality of 9 per cent.* (5 out of 56), which is greater than the risk of malignant degeneration.

These are the "later" results, but experience shows that the "last" results—i.e., after an interval of ten years or more instead of five years or less, would give a much greater number of unsatisfactory results, especially in view of the fact that Mr. Lake allows his patients to eat whatever they like. In the German and American clinics, in which partial gastrectomy has been the routine surgical treatment of ulcer for ten years, so many anastomotic ulcers have followed the operations recommended by Mr. Lake that nothing less than excision of four-fifths of the stomach is now performed. This would presumably have a still higher mortality, and we shall have to wait another ten years before we know how often it is followed by jejunal ulcer. Then I expect complete gastrectomy will become the operation of choice, for nothing short of this will produce achylia, as Klein has shown that when the secretion of appetite juice is stimulated by tasting or seeing food, but nothing is swallowed, free acid appears in the small portion of the stomach still remaining after subtotal gastrectomy.

It is clear that, *if* Mr. Lake's results can be taken as typical: (1) gastro-enterostomy is unjustifiable except for pyloric obstruction because of the 36 per cent. unsatisfactory results; and (2) partial gastrectomy is unjustifiable because of the high mortality.

An interesting commentary on Mr. Lake's paper is the fact that since 1921 we have had at New Lodge Clinic 37 patients suffering from gastric ulcer, 165 from duodenal ulcer, and no less than 67 from the ill-results of gastro-enterostomy or partial gastrectomy, performed in most instances for ulcer. Our experience shows that gastro-enterostomy is the commonest gastric disorder to-day, and undoing gastro-enterostomies is the gastric operation we now most frequently recommend. I am, Sir, yours faithfully,

ARTHUR F. HURST.

New Lodge Clinic, Windsor Forest, August 15th, 1928.

To the Editor of THE LANCET.

SIR,—I have read with interest Mr. Lake's paper published in your issue of August 11th; there is a good deal in it, however, which does not coincide with my own experience. An extensive inquiry into the after-results of a short-circuiting operation for duodenal ulcer show that these are at least as good as those following any surgical procedure in the abdomen. I am not concerned here with the respective merits of gastro-duodenostomy and gastro-jejunostomy; and for the sake of convenience will hereafter refer to both as gastro-enterostomy.

I am sure that surgeons who are constantly and fully carrying out the technique involved in the operation of gastro-enterostomy will regard Mr. Lake's figure of 36 per cent. unsatisfactory results as much too high. Indeed, such a figure is undoubtedly a very strong reason for seeking some other operative procedure. In my experience the unsatisfactory results are not more than 10 per cent., and in many of these the symptoms are so slight and evanescent that the cases should be included under Mr. Lake's heading of "satisfactory." Again, it is not clear on reading this paper how many gastrectomies were done for duodenal ulcer and how

many for gastric ulcer. It is essential to differentiate, for in many respects the two diseases are very unlike. The type of patient is not the same, gastric ulcer makes the patient much more ill as a rule, and duodenal ulcer is virtually never the precursor of malignant disease. It is a debatable point as to how often carcinoma becomes grafted on to gastric ulcer, but I think most surgeons allow that it happens sufficiently often to cause the possibility of any such change to pass through their minds on most of the occasions on which they deal with a gastric ulcer. The difference between the two types of ulcer (or perhaps one should say the types of patient) has a vital bearing on the statistics of anastomotic ulcer following gastrectomy. I have seen three cases where such an ulcer had formed after partial gastrectomy had been done for jejunal ulcer in which gastro-enterostomy had been done previously for duodenal ulcer; I have Sir Berkeley Moynihan's permission to say that he has had 12 such cases sent to him, and that he has never seen an anastomotic ulcer develop after a primary gastrectomy for gastric ulcer. Mr. Lake's explanation, that too little of the stomach was removed (that is to say, not all of the acid secreting part) does not apply to these cases.

Because of the difficulty of dealing directly with ulcers on the posterior surface of the duodenum, eroding the pancreas and causing marked deformity, I should regard these as the ulcers to be treated by gastrectomy, if this operation were ever necessary for duodenal ulcer; but gastro-enterostomy is very successful in these cases and the mortality is less than 1 per cent. I venture to say that in a series of this type gastrectomy would show a very much bigger mortality, and I presume this is the kind of ulcer Mr. Pannett has in mind when he finds it necessary to insert in his book on gastro-duodenal ulceration some paragraphs dealing with injury to the bile and pancreatic ducts as a complication which is observed in a certain percentage of cases of resection.

It is a great mistake to think that having performed the operation of gastro-enterostomy the business is finished. It is essential to deal with the ulcer itself at the time, and to treat the patient medically for long afterwards. I would suggest that the failure to take these two points into consideration in compiling statistics goes far to explain the high figures of unsatisfactory results sometimes given. This does not condemn gastro-enterostomy, or show the necessity to substitute gastrectomy; it is a reflection on the vision of the surgeon, for after all there is, or may be, still an ulcer present, and the operation only goes part of the way in promoting the patient's complete recovery.

I think if Mr. Lake could show that gastro-enterostomy gave the high percentage of unsatisfactory results which he quotes, in spite of a full measure of complementary treatment before, at, and after the operation, he would convince his readers that there were sound grounds for advocating gastrectomy for duodenal ulcer—even though it is followed by a higher mortality, and carries with it the risk of anastomotic ulceration, a risk which may prove to be as great as that after gastro-enterostomy, if no more.—I am, Sir, yours faithfully,

E. R. FLINT, F.R.C.S. Eng.

Leeds, August 15th, 1928.

THE HEART AND CIRCULATION IN BERI-BERI.

To the Editor of THE LANCET.

SIR,—May I refer Dr. Sutherland to the *Dublin Journal of Medical Science* for October, 1916, in which I draw attention to the negative pressure existing in the pericardium of a healthy person, and its tendency to disappear from the pericardia of persons in ill-health, especially those with serous effusion in the large cavities. This negative pressure results in a suction action whereby the pericardial fluid is kept at an equal thickness all over the surface of the heart and acts as a support to the working organ. A removal of that support affects the weaker-walled right ventricle at an earlier stage than the left. I have suggested the formula $F=(P+I)\div(T+S)$ where F = fibrillation, P = pressure, I = impulses, T = tone, and S = support; from which it is easy to see that if tone or support or both be diminished the tendency to fibrillation is increased. In beri-beri effusion occurs into the serous cavities, the general feebleness of the circulation implies that tone is less, consequently heart failure sets in. Prof. Wenckebach suggests the existence of a law of circulatory correlation between the right and left heart, working along simple mechanical lines. Does my formula help him in his contention?

I am, Sir, yours faithfully,

G. ARBOUR STEPHENS,

Consulting Cardiologist, King Edward VII. Welsh National Memorial.

Swansea, August 18th, 1928.

THE VITAMIN A CONTENT OF COD-LIVER OILS.

To the Editor of THE LANCET.

SIR,—In your issue of June 30th (p. 1353) Prof. J. C. Drummond attempts to counter statements made in an article published in the *Anglo-Norwegian Trade Journal* for May, 1928, which is based upon information which I have given the editor of that journal. Drummond's reply does not touch upon the crux of the matter, and is therefore unsatisfactory. As previous articles regarding this matter have appeared some years ago, a short résumé is necessary.

1. In 1924 Prof. Drummond (University College, London), jointly with Dr. S. S. Zilva (the Lister Institute, London) and Dr. Graham (The Fisheries Laboratory, Lowestoft), published in the *Biochemical Journal* (1924, XVIII., 178) a paper entitled: The Relation of the Vitamin A Potency of the Liver Oil to the Sexual Condition and Age of the Cod. In this very searching work they particularly treated the question whether the spawning of the cod had any influence on the vitamin content of the oil. Repeatedly, and in a most definite way, it is stated in the article referred to that no such influence could be demonstrated. For example: regarding the results of the four series of tests of cod from Flamborough and Scarborough during the months of January to June, it is stated that "even the liver oils from spent cod in March fish, which must have spawned just before being caught, and which had no time to recuperate, did not deviate in potency from the oils of fish before spawning, and several months after spawning and consequently after recuperation." The paper ends up with the following summary: "The sexual condition and age of the cod do not influence the vitamin A potency of the liver oil." In 1924 I myself carried out similar investigations, and came to the same conclusion, but in view of the paper in the *Biochemical Journal*, I considered any publication of my findings superfluous.

2. In 1925 Prof. Drummond published in THE LANCET (Sept. 26th, p. 679) a paper in which, without producing any fresh data, he says, with regard to oils produced in the important fishing district of Lofoten (Norway), that during spawning the oil becomes poor in vitamins and contains only one-tenth to one-fifth of the vitamin potency of that of oil from other places (Finmarken and Newfoundland), where the fisheries do not take place during the spawning period. The reason apparently being that, when the fish "are practically starving during the spawning period, and are at the same time transferring much fat and vitamin to the reproductive cells, the livers yield an almost white oil of relatively low potency." This is exactly opposite to the findings of Prof. Drummond and his collaborators in 1924: about the fish in this condition it is here said that "the relative potency of the residual liver oil is, however, not effected."

Drummond's paper of 1925 has during these years served as the basis for an exceedingly intense advertising of Newfoundland cod-liver oil, at the expense of the Norwegian oil and at great economic loss to the latter.

3. It was not until several months later that I became aware of Drummond's article in THE LANCET of Sept. 26th, 1925, and I thereupon wrote a rejoinder which appeared in your issue of Feb. 6th, 1926 (p. 320). Therein I expressed surprise that the Prof. Drummond of 1925 should contradict the Prof. Drummond (and his colleagues) of 1924. My paper was couched in the most moderate terms. I sent a copy of it to Drummond, and although it appeared necessary that he should furnish some explanation, he sent me no answer.

4. On the other hand, a reply was made by Dr. Zilva, who had previously collaborated with Prof. Drummond. This reply is now made use of in such a way by Drummond in your issue of June 30th (p. 1353) that the reader who has not kept fully in touch with developments may get the impression that Zilva supported Drummond. I do not believe others will agree with this interpretation. Zilva's reply leaves nothing to be desired in the way of explicitness:

"As I did not see Prof. Drummond's article until it appeared in print I do not hold myself responsible for everything stated therein. Prof. Poulsson is quite right in asserting that the sexual condition of the cod during spawning has no bearing upon the activity of the oil, as was shown by my colleagues and myself, and I feel gratified that this work has been confirmed by our Norwegian colleague."

Prof. Drummond must be in a most unhappy frame of mind when he accepts this severe correction without a word of protest.

It appeared inevitable that Prof. Drummond should at this juncture explain himself, but no such explanation has been made, not even in his last letter. Instead of explaining upon what basis in 1925 he denies results achieved by himself and his colleagues in 1924, he devotes a lot of space to treating other subjects not relevant to the present issue. For example, a comparison is made between the biological and colorimetric tests, obviously in order to get an opportunity to point out that my tests of certain samples of cod-liver oil had been carried out according to a defective method. In this connexion I will content myself with pointing out that these assays had partly been completed already in 1923; the improved and now applicable method was described by Steenbock in 1924.

Summarising the above, we find ourselves faced with an instance of an author contradicting himself and his colleagues without communicating with them (one of them subsequently denying responsibility), without producing new data, and without offering any explanation. A situation of this kind is unparalleled in scientific discussion, and the situation is by no means clarified by Drummond's last letter, except in so far as he has now abandoned the contention which formed the chief basis of his paper in THE LANCET of Sept. 26th, 1925—namely, that the sexual condition of the cod during the spawning period influences the vitamin content of the liver oil.

I am, Sir, yours faithfully,

Oslo. E. POULSSON.

INSTRUCTION IN PSYCHIATRY.

To the Editor of THE LANCET.

SIR,—I should like in the first place to thank you for the kindly notice of my book on "Mental Disorders" in your issue of July 21st. My object in writing to you now is to comment on Dr. Estelle Cole's letter in your issue of August 11th. I hope that your review will be approved not only by "many of the older school of psychiatry," but also by those of some at least of the newer schools who realise the inchoate condition of much of modern psychological teaching regarding, for example, the psychoneuroses. So long as such a short period of time is allotted in the medical curriculum for the teaching of psychiatry in general, it seems to me that it would be unwise to employ more than a modicum of it in dealing with contentious psychological matters. When there is something approaching a settled doctrine I shall be only too glad to set it forth for those students and others who may care to read what I write. In conclusion, I find myself in complete agreement with what you say in your note that "so important and difficult a subject should be properly taught or left alone." It seems to me that there is a good deal of modern pseudo-psychology—or pseudo-psychopathology—which is not properly taught, but which is improperly practised.

I am, Sir, yours faithfully,

Wimereux, August 20th, 1928. HUBERT J. NORMAN.

"FUSSING OVER CANCER."

To the Editor of THE LANCET.

SIR,—Your correspondent "D.P.H.," in the course of an excellent letter, remarks that it is really a truism to say that "the earlier cancer is detected the better are the patient's chances of recovery." Having made this uncontroversial statement, he goes on to ask: "Why is there a certain hesitancy . . . in launching educational campaigns with regard to cancer?" and the inference would seem to be that "cancer campaigns throughout the world" have neglected this very useful part of what should be one of their primary activities. In order to attempt to prevent this inference being accepted as the whole truth of the matter, may I be allowed to draw the attention of your readers to some of the educational work undertaken by the Yorkshire Council of the British Empire Cancer Campaign?

Shortly after the Yorkshire Council was created, our leader, Sir Berkeley Moynihan, recognising that the education of the public was of prime importance, proposed that a propaganda subcommittee should be formed and financed. This was done, and the funds placed at its disposal were considerable in amount and were mainly derived from donations given by Insurance and Panel committees in the County. This subcommittee has done a great deal of work. It has issued a very comprehensive little book entitled "Notes on Cancer," prepared under the direction of the Medical and Scientific Committee of the Yorkshire Council. Free copies of this book have been sent to all practitioners in the county and many have been sent, by request, to almost all parts of the Empire. Any practitioner requiring the book may have it on application to our Secretary, at 47, Park-square, Leeds. The subcommittee has organised several courses of post-graduate lectures to practitioners by eminent authorities, the list of lecturers including the names of such well-known men as Sir Berkeley Moynihan, Prof. G. E. Gask, Prof. Grey Turner, Dr. Major Greenwood, and Prof. Sampson Handley. Most of these lectures have been very largely attended, and there is a demand for further courses which the subcommittee hopes shortly to be able to meet.

Having, in the above ways, attempted to assist practitioners by placing before them the latest available information, the subcommittee directed its attention to an effort to educate the public. It first succeeded in obtaining the services of a competent woman doctor who was well fitted to place facts before individuals which it felt they ought to know. It then organised a series of public demonstrations, called—for want of a better name—"cancer exhibitions." Each exhibition visits a selected town and is open to the public for, usually, one week. Various statistics, showing the number of deaths arising from cancer in different parts of the body are exhibited in graphical form. Large quantities of leaflets are used and visitors urged to take them home and show them to their friends. Information

on various questions of health is given. Lectures by medical men and women of standing are delivered, and each day a local doctor gives a short talk, emphasising the necessity for early advice and treatment in all cases where the disease may be suspected. The woman demonstrator has personal interviews with visitors throughout each day and the burthen of her story is: "If you have anything wrong—or if you *fear* you have anything wrong—don't go on anxiously worrying, but consult your doctor and ask him to examine you and advise." These exhibitions have been attended by marked success. Thousands of people have visited them, and excellent reports of the lectures and addresses have been given in the public press. They are not easy to organise, for the difficulty in making them attractive to the public, whilst at the same time excluding all "gruesome" details is a very real one. None the less the subcommittee is very satisfied with the results. The deplorable experience of Dr. Stanley Reimann, as given in "D.P.H.'s" letter, has not been ours! When our work began I think most lay people agreed that a diagnosis of cancer—no matter where situated or how early or late it had been recognised—was tantamount to a sentence of death. This is not so now. The facts that some 50,000 people die annually from cancer in England and Wales; that getting on for 20,000 of these cases originally arise from superficial—and therefore get-at-able areas; that an enormous percentage of early cases have been shown by fully confirmed hospital reports to be alive 10 years after treatment, constitute, when proclaimed, a "message of hope" which the public is not slow in appreciating. Evidence supplied by surgeons and general practitioners in our county convinces us of this.

The fears of "frightening people to death," of "creating a nation of neurasthenics," do not impress the members of our Council. Our leader's happy phrase—"frightening them to *life*"—appeals to us more strongly, and it is a long time since I read so excellently logical an exposure of the futility of commonly used objections as that given in the letter of "D.P.H."

I am, Sir, yours faithfully,

G. B. HILLMAN,

Chairman, Medical Propaganda Subcommittee, Yorkshire Council, British Empire Cancer Campaign.

Wakefield, August 18th, 1928.

OSTEOCLASTOMA.

To the Editor of THE LANCET.

SIR,—I should be much obliged if you will correct an error which appears in THE LANCET of July 28th (p. 183) in the report of the proceedings of the recent International Conference on Cancer. In the discussion on bone sarcoma I spoke in favour of the view that the so-called giant-celled tumour or myeloid sarcoma is derived from the fibrous-tissue framework of bone and that the giant cells are osteoclastic (not osteoblastic) in nature. Osteoclastoma (not osteoblastoma) was suggested as a better name for this tumour than any of those at present in use, combining, as it does, brevity with precision of meaning.

I am, Sir, yours faithfully,

Leeds, August 15th, 1928. M. J. STEWART.

PAYMENT FOR MOTOR ACCIDENT PATIENTS.—The governors of Folkestone Royal Victoria Hospital last week adopted the following resolution: "In cases provisionally admitted by the resident medical officer or by the matron for immediate treatment which has become obligatory as the result of a motor accident, each patient admitted shall pay for treatment at the rate of 11s. 4d. per day, subject, however, to the committee deciding subsequently that these charges be increased, reduced, or remitted." The resolution was the result of correspondence with the Central Bureau of Hospital Information.

Obituary.

WILLIAM SMITH SYME, M.D. EDIN., F.R.F.P.S. GLASG.

Mr. Syme, who died suddenly on August 14th, when on a holiday in North Wales, was well known in Cumberland and south-west Scotland as a specialist and writer on diseases of the nose, throat, and ear. Born in Harbour Grace, Newfoundland, in 1870, he was at an early age sent to school at Blair Lodge and continued his medical studies at Edinburgh, where he qualified M.B., C.M. in 1891. He then went as assistant to Dr. Charles Wilson, of Crewe, before starting general practice himself at Gamlingay, Cambs, where he remained till 1902. He had always enjoyed the life of the country and at that time he joined in the field sports of all kinds, being captain of the cricket team for some years. His return to Scotland was actuated by the desire to develop the more scientific professional side of his work, and after attending the clinics of Dr. Thomas Barr at the Ear Hospital and Dr. J. W. Downie at the Western Infirmary, and working on the former's staff, he decided to specialise in ear, nose and throat work, and in 1904 began consulting work in this specialty in Carlisle, and some years later in Dumfries. In 1913 the course at the Western Medical School was recognised by the University; in 1917 Mr. Syme was appointed surgeon to the Ear, Nose and Throat Hospital, and three years later to the Nose and Throat Western Infirmary. In the same year he became lecturer on diseases of the throat, later adding appointments and a lectureship in ear surgery to his other duties.

MR. W. S. SYME.

Photo by Annan, Glasgow

Mr. Syme was one of the founders of the Scottish Otological and Laryngological Society, and for many years its hon. secretary and treasurer. He was a ready and accurate writer on clinical subjects, his most considerable literary work being a handbook for students and practitioners, published in 1920, of which a new edition has recently appeared. His aim in this book was especially to stimulate the interest of students in a subject likely to concern them very closely, immediately on entering general practice. His oral teaching will be missed by Glasgow students who found in him the embodiment of good-humoured energy, and one who always showed an active interest in athletics, while the nursing staff were pleasantly aware of the uniform kindness and courtesy with which he treated both patients and their relatives. His devotion to duty and the heavy claim of detailed professional work are regarded by his friends as contributory to his early death. Few men,

it is said, held such a place in the esteem and affection of their colleagues.

Mr. Syme married in 1895 a daughter of Thomas Paisley, J.P., of Greysouthen, Cumberland, and is survived by his wife, two sons, and four daughters.

MARY LAUCHLINE McNEILL, M.B. GLASG.

NEWS has been received from Kamali, Africa, of the death of Dr. Mary McNeill, on June 10th, from typhoid fever at Jinga Hospital. Dr. McNeill was born in 1874 at Holm in the Orkney Islands, eldest daughter of the Rev. Daniel McNeill, M.D. She went to school at Fochabers, studied music and languages in Germany and Switzerland, and later became a medical student at Queen Margaret College, Glasgow, where she graduated in 1905. She then returned to Orkney and practised there until 1914, when she went to Leicester to relieve her brother for service with the R.A.M.C. In 1916 Dr. McNeill held the appointment of resident physician in the Leicester Fever Hospital for several months until she joined the staff of the Scottish Women's Hospital in Salonika. She remained there until early in 1919, when she moved with the hospital to Belgrade. In the autumn of the same year she went to Tiberias, in Palestine to the U.F. Medical Mission under Dr. Torrance, and thence to the Central Provinces, India, until 1921. After a short holiday at home she became a member of the Church of Rome and joined the Catholic African Mission, first at Kampala, Uganda; latterly she worked single-handed with three Franciscan Sisters at a remote station in Kamali. She was looking forward to coming home on leave in November.

Prof. A. L. McIlroy writes: "Those who knew Dr. Mary McNeill loved her for her upright character, her unselfish life, and her devotion to her family. Her mysticism and joy in living was a source of wonder to her friends. She took a great interest in literature and art, and had a most marked gift for writing and for poetry. She was a loyal colleague, and always upheld the administration of those under whom she worked. Dr. McNeill never lost her youthful interest in people and places. She had travelled extensively, had absorbed new ideas and made friends wherever she journeyed. Her passing has left a great gap in the hearts of her friends."

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the Committee 50 applications for assistance were considered and £825 5s. voted to 45 cases. Consideration of the following notes on a few of the applicants helped will show how sad some of the cases are and how urgent is the need of help, yet unfortunately the grant was small. The Fund appeals for subscriptions to enable it to make more adequate grants. Subscriptions and donations should be sent to the hon. treasurer, 11, Chandos-street, Cavendish square, W. 1.

L.R.C.S. Edin., aged 74, married; wife aged 72. The husband is completely broken down in health and is quite unfit to do any kind of work. This old couple have a total income of £82 a year, made up of Old Age Pension £52 and Epsom Pension £30. As their rent is £26, there remains only £56 for food and clothes. Voted £40, thus raising their income to £122 a year.

M.D., aged 75, bedridden. Has no private means, but was able to earn a little last year from literary work. Voted £40.

Widow, aged 80, of M.D. Bedridden and suffers from cerebral and anginal attacks, requires nursing day and night. Her only income is £50 being rent from a property which she has been unable to sell. Her two children have done all in their power to help and have contributed £42 a year. Voted £40.

Widow, aged 73, of L.R.C.P. On the death of her husband in 1928 her house was sold and the proceeds went to pay off existing debts, leaving the widow only £370 as capital. She is in receipt of Old Age Pension. Her relations have given some financial assistance this year but cannot continue to do so. Voted £26.

Widow, aged 52, of M.B. Since the death of her husband has supported herself and her invalid son by taking in paying guests, but owing to ill-health (diabetes) has been unable to take guests during the last 12 months. Her son has a congenital heart with marked cyanosis. Income during past year was investments £7 10s. and from a paying guest £6. Voted £26. The Fund is trying to get other charities to assist in this very sad case.

Medical News.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations the following candidates satisfied the examiners in the undermentioned subjects:—

Surgery.—J. P. Collinson, Sheffield and London Hosp.; H. B. Blaker, St. Mary's Hosp.; E. C. Gross, Guy's Hosp.; I. G. Hardinge, Charing Cross Hosp.; G. L. Johnson, Columbia Univ., U.S.A.; C. K. McCoan, St. Mary's Hosp.; and C. F. C. White, Guy's Hosp.

Medicine.—T. A. Barnabas, Bristol; C. M. Brooks, Durham; J. S. Bury, Manchester; A. E. Gibbs, London Hosp.; K. Girgis, Manchester and Charing Cross Hosp.; I. G. Hardinge, Charing Cross Hosp.; H. H. Jackson, Manchester and Charing Cross Hosp.; G. L. Johnson, Columbia Univ. U.S.A.; H. C. Johnson, Minnesota, U.S.A.; J. H. Johnston and G. L. McDermott, St. Bart.'s Hosp.; M. T. Y. Selim, Liverpool; and H. D. K. Wright, St. Bart.'s Hosp.

Forensic Medicine.—N. Das, London Hosp.; E. C. Gross, Guy's Hosp.; I. G. Hardinge, Charing Cross Hosp.; A. H. Hennessy, Adelaide and London Hosp.; G. L. Johnson, Columbia Univ., U.S.A.; H. C. Johnson and K. R. Lundeberg, Minnesota, U.S.A.; C. P. Madden, St. Bart.'s Hosp.; S. M. Rahman, Calcutta and Middlesex Hosp.; M. T. Y. Selim, Liverpool; and H. D. K. Wright, St. Bart.'s Hosp.

Midwifery.—C. M. Brooks, Durham; H. C. Clifford-Smith, Charing Cross Hosp.; W. A. A. Collington, Guy's Hosp.; J. P. Collinson, Sheffield and London Hosp.; F. W. Crossley-Holland, St. Bart.'s Hosp.; L. P. Gregory, Bristol; I. G. Hardinge, Charing Cross Hosp.; A. H. Hennessy, Adelaide and London Hosp.; G. L. Johnson, Columbia Univ., U.S.A.; H. C. Johnson and K. R. Lundeberg, Minnesota, U.S.A.; R. Perkins, St. Bart.'s Hosp.; and T. A. P. Proctor, Birmingham.

The Diploma of the Society was granted to the following candidates entitling them to practise medicine, surgery, and midwifery: H. B. Blaker, H. C. Clifford-Smith, J. P. Collinson, I. G. Hardinge, A. H. Hennessy, G. L. Johnson, G. L. McDermott, S. M. Rahman, M. T. Y. Selim, and H. D. K. Wright.

DERMATITIS AMONG BAKERS.—At the Eighteenth Annual Congress of the Amalgamated Union of Operative Bakers and Confectioners held at Cardiff on August 20th, attention was called by the general secretary of the union (Mr. W. Anfield) to the alarming spread of dermatitis among bakers throughout the country. He asserted that there is a conspiracy of silence on the part of men suffering from the disease and also on the part of their employers. He believed that for every one man reported to be suffering from this disease there were three others unreported. It was suggested that since 1918 and 1919 something had been introduced into the raw material used by bakers which had caused a greater spread of this disease, and that the sole sufferers are the operative bakers. A resolution was passed stating that the conference viewed with alarm the spread of dermatitis among members of the union, and urged the Executive Committee to spare no expense in the matter, and to call for the assistance of the Government department together with the Master Bakers' Association and the millers and the medical profession.

THE LONDON HOSPITAL.—In 1927 the annual report records there were 16,840 in-patients who stayed, on an average, 15–19 days and cost £11 3s. 6d. each. New out-patients to the number of 114,509 made 567,525 attendances at a cost of 12s. each. The total ordinary income increased from £234,088 to £263,546, while ordinary expenditure fell from £262,900 to £250,419. The year's legacies totalled £51,315, nearly double the average.

CONTRIBUTIONS TO HOSPITALS FROM DOCKERS.—More than 10,000 dockers have agreed in writing to contribute to the Merseyside Voluntary Hospitals Penny-in-the-Pound scheme.—During the year ended on June 30th last Devonport Dockyard and its allied establishments, by means of a similar scheme, raised £5136, making a total for the last five years of £20,891.

MANCHESTER GUARDIANS AND CANCER FUND.—The Manchester board of guardians at its meeting on August 22nd again discussed the guardians' contribution of £1000 to the Lancashire, Cheshire, and North Wales Council of the British Empire Cancer Campaign, as the result of a letter from the Minister of Health intimating his inability to sanction the contribution. It was stated that the Minister was "unable to regard so considerable a donation to a fund of this kind as being within the spirit and intention of Section 36 of the Poor-law Act, 1927." He was, however, prepared to consider favourably applications from the guardians to subscribe reasonable amounts to the funds of the hospitals undertaking the treatment of cancer, in which persons receiving relief from the guardians are having, or are to have, assistance in cases of necessity.

MATERNITY HOSPITAL FOR SOUTHPORT.—The Southport Health Committee has accepted the offer of Miss Christiana Hartley, a former mayor of the town, to build a new maternity hospital. The present building was a temporary soldiers' hospital and last year, out of 1000 births in Southport, 300 took place within it. The new institution will be adjacent to the infirmary and will correspond, in design and material, with its main block.

THE LATE DR. S. W. GRIFFITH.—Samuel Wilbraham Griffith, of the Hermitage, Pwllheli, died suddenly on August 24th, aged 72. He began his medical studies in Dublin and continued them in Edinburgh, where he qualified L.R.C.P. and L.R.C.S. in 1884. He was one of the best-known medical practitioners in North Wales, a J.P. of Carnarvonshire, and senior magistrate of the shire, having officiated in the Pwllheli Court for nearly 40 years.

ROYAL WESTMINSTER OPHTHALMIC HOSPITAL.—This hospital, which has been under construction on its new site in Broad-street, Holborn, since November, 1926, is now completed and will be open for the admission of in-patients on Monday, Sept. 3rd. The out-patient and casualty departments were opened last Easter. In addition to the public wards, there are 14 single private rooms, which will be available in the autumn. The new hospital has cost, including the freehold site, about £150,000, towards which nearly £100,000 has been raised by the sale of the old site in King William-street, Strand, and by public appeal. The remaining £50,000 has yet to be found.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.1.

MONDAY, Sept. 3rd, to Saturday, Sept. 8th.—QUEEN MARY'S HOSPITAL, Stratford, E. Second week of Intensive Course in Medicine, Surgery and the Specialties. Syllabus on application to the Secretary.

Appointments.

BRECHIN, F., M.B., B.Ch. Glasg., D.P.H., has been appointed Medical Officer of Health, Renfrew.

DAVIDSON, M., M.D. Oxf., F.R.C.P. Lond., Consulting Physician to St. Luke's Hospital, Chelsea.

DUNSCOMBE, CLEMENT, M.B., B.Chir. Camb., D.P.H. Oxf., Medical Officer of Health for Mansfield Woodhouse, Notts., and Assistant School Medical Officer, Nottinghamshire County Council.

LOBBAN, G. M. D., M.B., Ch.B. Leeds, Assistant Schools Medical Officer, Oldham.

MITCHELL, L. M. V., M.B., Ch.B. Edin., to be one of the Medical Referees under the Workmen's Compensation Act, 1925, for Inverness (Mainland) District of the Sheriffdom of Inverness, Elgin, and Nairn.

ROWNTREE, S. J., M.R.C.S., L.R.C.P. Lond., Certifying Surgeon under the Factory and Workshop Acts for Islington.

STEVENS, W. G., L.R.C.P., L.R.C.S. Edin., Consultant Medical Officer of Health, Renfrew.

THOMSON, H. W., M.D. Glasg., a Specialist Medical Referee under the Workmen's Compensation Act for Ophthalmic Cases in the Sheriffdom of Lanark.

Surgeons under the Factory and Workshop Acts: BELLIS, T. M.B., Ch.B. Liverp. (Llanfairfechan); BRUCE, D. W. (Chagford, Devon); ELLIS, G. E., M.B., B.S. Lond. (Bourton, Dorset).

Vacancies.

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road, E.—Res. M.O. At rate of £110.

All Saints' Hospital, 49–55, Vauxhall Bridge-road, S.W.—H.S. At rate of £150.

Birmingham and Midland Eye Hospital, Church-street.—H.S. £110.

Bolingbroke Hospital, Wandsworth Common, S.W.—Res. M.O. £200.

Brighton Education Committee.—Asst. Sch. M.O. £600.

Cairo, Egyptian University.—Faculty of Medicine: Professor of Forensic Medicine. L.E. 1500. Also Prof. of Clin. Surg., &c.

Canterbury, Kent and Canterbury Hospital.—3rd Res. M.O. At rate of £125.

Cheltenham Borough.—M.O.H. and Sch. M.O. £850.

Chester Royal Infirmary.—H.P. £120.

Croydon General Hospital.—Cas. H.S. £125.

Dorchester, Dorset County Hospital.—H.S. At rate of £120.

Dreadnought Hospital, Greenwich.—H.P. and H.S. Each at rate of £110.

Eastbourne, Princess Alice Memorial Hospital.—Jun. H.S. At rate of £100.

Exeter, Wonford House.—Deputy Medical Supt.

Hull, City and County of Kingston-upon-Hull.—Asst. M.O.H. £600.

Leeds City Hospitals.—1st Asst. Res. M.O. £450.

Lincoln County Hospital.—Jun. H.S. At rate of £150.

Lowestoft, St. Luke's Hospital.—Med. Supt. £800.

Manchester, Ancoats Hospital.—H.S. At rate of £100.

Manchester Babies' Hospital, Burnage-lane, Levenshulme.—Res. M.O. At rate of £125.

Manchester, Monsall Hospital for Infectious Diseases.—Second Asst. M.O. Also Jun. M.O. At rate of £375 and £350 respectively.

Manchester, Royal Children's Hospital, Gartside-street.—Asst. M.O. At rate of £150.

Manchester, Royal Children's Hospital, Pendlebury.—Res. Surg. Officer. At rate of £125.

Metropolitan Ear, Nose and Throat Hospital, Fitzroy-square, W.—H.S. £150.

Miller General Hospital for South-East London, Greenwich-road, S.E.—Pathologist. £600. Also H.P. At rate of £125.

National Hospital for Diseases of the Heart, Westmoreland-street, W.—Res. M.O. At rate of £150.

Northampton General Hospital.—H.P., H.S., and two Asst. H.S.'s. Each at rate of £150.

Patna Medical College.—Prof. of Physiology. Rupees 1200.

Plymouth, Homœopathic and General Hospital.—H.S. At rate of £100.

Prince of Wales's General Hospital, Tottenham, N.—Res. Anæsthetist. At rate of £120.

Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Asst. Res. M.O. At rate of £80.

St. George's Hospital Medical School, S.W.—Pathologist and Lecturer in Pathology. £575.

St. Mary's Hospital, W.—Asst. Pathological Chemist. £300.

St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—H.S. At rate of £75.

Salford Municipal Maternity Home and Babies' Hospital, Seedley-terrace, Pendleton.—Asst. Maternity and Child Welfare M.O. £600.

Salisbury General Infirmary.—H.S. £150.

Shrewsbury, Royal Salop Infirmary.—Res. H.S. At rate of £160.

Truro, Royal Cornwall Infirmary.—H.S. £170.

Tunbridge Wells and Counties General Hospital.—H.S. £160.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.

West London Hospital, Hammersmith-road, W.—H.P. and two H.S.'s. Each at rate of £100.

Westminster Hospital, Broad Sanctuary, S.W.—H.S. to Eye, Ear, Nose and Throat Depts. At rate of £102.

Wolverhampton and Staffordshire Hosp.—H.S. At rate of £150.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Langport (Somerset) and Aspatria (Cumberland).

The Home Secretary gives notice that in consequence of the death of Dr. A. Stuart, Medical Referee under the Workmen's Compensation Act for the Central District of the Sheriffdom of Perth, the appointment held by him is vacant. Applications for the post should be addressed to the Private Secretary, Scottish Office, Whitehall, London, S.W.1, and should reach him not later than Sept. 19th, 1928.

Births, Marriages, and Deaths.

BIRTHS.

BALTER.—On August 14th, at Avenue-road, N.W., the wife of David N. Balter, M.D., of a son.

HINGSTON.—On August 20th, at Uplands Cottage, Belvedere-drive, Wimbledon Hill, S.W., the wife of Major H. Hingston, I.M.S., of a son.

RICHARDS.—On August 15th, at Adelaide-road, N.W., the Hon. Noel Olivier, wife of W. Arthur Richards, F.R.C.S., of a daughter.

RUSSELL.—On August 24th, at "Bredon," Alverstoke, Hants, the wife of Dr. Norman L. Russell, of a son.

SKEGGS.—On August 26th, at Bicknor Lodge, Stevenage, the wife of Dr. B. Lyndon Skeggs, of a son.

SMALLEY.—On August 21st, the wife of Dr. L. Smalley, Montfort Cottage, Kenilworth, of a daughter.

TROTTER.—On August 27th, at "Braemar," Haslemere-road, London, N., the wife of Dr. G. Clark Trotter, M.O.H., Islington, of a daughter.

MARRIAGES.

SHELDRAKE—LANE.—On August 18th, at the Parish Church, Leamington Spa, William Donbavand Sheldrake, M.B., B.S. Lond., to Ida Frederica Lane, youngest daughter of the late Mr. and Mrs. W. Billings Lane, of Bottisford, Lincolnshire.

DEATHS.

GREENWAY.—On August 19th, at Alexandra-drive, Surbiton, Charles Melville Greenway, M.R.C.S., L.R.C.P. (late of Plumstead), aged 58.

HUGHES.—On August 23rd, at Bristol, following an operation, Frank Percival Hughes, M.B., B.S.

KEBBELL.—On August 8th, at a nursing home, Earl's Court, Charles Frederick Vivian Kebbell, M.R.C.S., L.R.C.P., in his 42nd year.

KHAN.—At Gaya, India, on 20th July, 1928, Major Abdus Sattar Khan, I.M.S., from heart failure, aged 46. Deeply mourned.

MCVINE.—On August 16th, at Hazelwood-lane, N., Dr. J. W. McVine.

MOORHOUSE.—On August 17th, at Melville-terrace, Stirling, Dr. James Ernest Moorhouse, aged 58 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

HOSPITAL LAW.

LIABILITY OF HOSPITALS AND THEIR PROFESSIONAL STAFFS FOR TORTS.*

BY CAPTAIN J. E. STONE, *M.C.*, F.S.A.A.,
HON. SECRETARY, INCORPORATED ASSOCIATION OF HOSPITAL OFFICERS.

Operations.

No surgical operation can be performed on an adult patient without his or her consent if it is at all possible to obtain it. No operation, therefore, should be performed on a patient without the express consent of the patient, or if he is not in a position to give such consent, then of his nearest relative. Further, an operation must not be carried further than is warranted by the consent, and this consent should be founded on full knowledge of the nature and possible extent of the operation and the consequences which it may involve. Disregard of these precautions may cause the operation to be illegal, and to render the surgeon liable to an action for damages. In the case of a child similar precautions should be adopted except that instead of the patient's consent, the consent of a parent or guardian should be obtained. Even in the case of a child, it may be advisable to obtain his or her consent as well, especially if the child has attained years of discretion, for the power of the parent or guardian over the person of the child does not extend to the whole period of minority.

When a person has selected a surgeon to operate upon him, and has appointed no other person to represent him during the period of unconsciousness that constitutes a part of such operation, the law will by implication constitute such surgeon the representative of the patient, and will cast upon him the responsibility of so acting in the interests of the patient that the latter shall receive the full benefit of that professional judgment to which he is legally entitled. A surgeon undertook to perform a radical cure of a left inguinal hernia, and to do it gratuitously. When the patient was anæsthetised and ready for the operation to commence, a more serious rupture was found to exist on the right side. The surgeon accordingly dealt with the right hernia first, intending to deal with the left one afterwards. However, by the time the first operation was complete, the patient's condition was not so good and the second operation could not be commenced. The patient brought an action for assault and was awarded substantial damages; but a higher court set aside this decision on appeal. The grounds for this were that the use of anæsthesia modified the fundamental common law rule that consent must be given before an operation can be performed. Anæsthesia had postponed to the period of relaxation and unconsciousness the making of the complete and final diagnosis of the case, by which time consent could no longer be asked or obtained. These changed conditions are all for the benefit of the patient, and to allow them to be used as the basis of actions for assault or *mala praxis* would be contrary to the public interest. It will be noted that the decision is safeguarded by language which makes it safe from abuse, and confers no liberty upon the surgeon to carry out a more extensive or more dangerous operation than that for which he has obtained consent. A record of all professional staff in attendance at operations should be kept.

Who may Bring Action?

The only person who can properly bring an action for damages done to the person of the patient is the patient himself, even though a minor; otherwise in all cases of surgeons retained by any of the public establishments the patient would be without redress, for it could hardly be expected that the governors of a hospital would bring an action against the surgeon employed by them to attend the child of poor parents who may have suffered from his negligence and inattention (Pippin and Sheppard). Formerly, when a patient died as a result of the negligent treatment of a doctor or nurse, any right of action which he might have had in his lifetime ceased on the principle of the well-known maxim, *Actio personalis moritur cum persona*. By the Fatal Accidents Act, 1846, more commonly known as "Lord Campbell's Act," and called "an Act for compensating the families of persons killed by accidents," it was enacted that whenever the death of a person shall be caused by wrongful act, neglect or default, such as would (if death had not ensued) have entitled the party injured to maintain an action and recover damages, then the person who would have been liable if death had not ensued shall be liable to an action for damages, notwithstanding the death of the person injured, and although the death shall have been caused under such circumstances as amount in law to felony. Such actions must be for the benefit of the wife, husband, parent, or child of the deceased; be brought by his personal representative, and be commenced within 12 calendar months after the death of the deceased. If there is no legal representative, all or any of the persons for whose benefit such action would have been brought may themselves bring the action.

Rights and Obligations of Patients.

Voluntary hospitals are under no legal obligations to admit as patients persons who come to them for treatment. The fact that an institution is charitable is not in itself sufficient to entitle the public at large to demand free treatment, and cases can therefore be refused without any reasons being given. This right to refuse admission is, however, seldom exercised without some adequate ground for refusal, but such refusal would give the rejected applicant no cause of action against the governing body or the admitting officer.

A patient on admission to hospital submits himself to carry out any rules and regulations prescribed by the hospital with a view to enforcing on the part of the patients decent and orderly behaviour and obedience to orders. All hospitals have such rules, and the retention of a patient is conditional upon his observing such of the rules of the hospital as relate to his own conduct. A patient is entitled to expect to be treated with reasonable care and skill; this care, however, is so much and no more than a patient in that hospital would, according to its rules and practice, in the ordinary course receive. For instance, patients cannot complain at being attended by junior medical officers in the intervals of the visits of the physicians and surgeons, or because matters not requiring the personal attention of a qualified practitioner are left to the sister or nurse of the ward, or if in accordance with the ordinary practice of the hospital students or others accompany the physicians on their rounds. A patient so long as he remains in the hospital is bound to submit to the treatment bona fide ordered by the physician, and to its administration at the hands of the nurses or other agents employed by the hospital to carry out the treatment prescribed. A patient cannot be detained or treated against his will. If he does not comply with the rules of the hospital the proper remedy is not compulsion but expulsion. If it is found necessary to use force to a patient who exhibits violence or is insubordinate, the force employed should be reasonable and never be greater than is absolutely necessary.

Summary of Hospital's Position.

A hospital is *not liable* for:—

(*a*) The negligence of surgeons, physicians, nurses, or other officers in the exercise of their professional duties, provided it is shown that in the selection and appointment of such officers due and reasonable care was exercised. This as a practical proposition exonerates hospitals in most suits by patients, for in the ordinary case hospitals do exercise such care. (The exemption from liability does not follow the hospital because it is a charitable institution.)

(*b*) The negligence of a nurse (or other officer) assisting at an operation or in the carrying out of her purely professional duties.

A hospital *is liable* for the negligence of:—

(*a*) Nurses in the course of purely administrative duties over which the board has control.

(*b*) Other officers while under the control of the board.

(*c*) Its professional staff (surgeons, physicians, &c.) in the course of their professional duties, if it has not exercised due and reasonable care in their selection and appointment.

The mere fact that the officers are or are not remunerated is immaterial. The board are under no greater liability to a paying patient than to a non-paying patient.

Liability to Persons other than Patients.

Hospitals are liable for the negligent injury of those who do not bear to the hospital the relationship of patient—that is, those who are not beneficiaries of the hospital and its charitable purpose. In such suits hospitals are held by the law, as are all other concerns and individuals, to the use of due care—that is, such care as a prudent person would under like circumstances exercise, and failing in that would be liable in such damages as would fairly compensate the injured person. While, therefore, hospitals are held by the weight of judicial opinion to be exempt from liability for injuries to the recipients of their charity if they have selected their staffs with due care, no such exemption applies to injuries to others. Even though it has been proved that

* Two previous articles on this subject were published in THE LANCET of April 28th, p. 895, and July 14th, p. 102.

there was due care in the selection of the agents or servants where the relation of patient does not exist, and when the hospital would otherwise be liable, there is no exemption to the hospitals. Hospitals are bound to use ordinary care to have their premises in a reasonably safe condition. Cases coming under this heading would include injuries due to (1) defective lifts, (2) a lift shaft negligently left unprotected, (3) collision with hospital ambulance, (4) defective stairs, (5) falling roof slates or tiles, &c. The absence of reasonable care must, of course, be proved.

This phase of a hospital's liability is not confined to what may be termed strangers—i.e., persons other than patients—but it also includes the employees of the hospital. For instance, injuries suffered by a laundry worker, if not properly instructed in operating the machinery which it was her duty to work, or if caused by insufficient protection or defective condition of the machinery, would give good grounds for maintaining an action against the hospital. The fact that employees receive no money for their services, but only lodging, board, and uniforms, does not defeat their right to bring an action. Nearly all hospitals contract out in respect of their liabilities falling under both the above headings; one or two undertake their own risks by the establishment of insurance funds, into which annual premiums are paid and out of which all accident claims are met.

St. Thomas's Hospital, London, S.E.

"THE WELL OF LONELINSES."

THE fact that "The Picture of Dorian Gray" is now available in cheap editions, while "The Well of Loneliness" has been withdrawn by Messrs. Jonathan Cape at the request of the Home Secretary, suggests that Miss Radcliffe Hall's book may at some future date be restored to circulation. It is not, of course, comparable in artistic merit with Wilde's work, nor even with Miss Radcliffe Hall's previous novel, but it is an honest attempt to portray the temptations, the emotional conflicts, and the social dilemmas of the homosexual woman. The author has considerable dramatic skill, though her emphasis is sometimes misplaced. The implication that the parents' desire to produce a son may alter the emotional affinities of the daughter born to them is difficult to accept; the origin of abnormal sex attractions cannot be so simply explained. The fallacy of the book lies in the failure to recognise that strong attachments between members of the same sex occur as a phase of normal development. Those who fail to outgrow this phase can be helped to divert their emotions into other channels. If their efforts are ineffectual their life must always be unhappy, for the race is bound to erect such barriers as will discourage the development of affinities dangerous to its existence. This duty is well recognised by Miss Radcliffe Hall. Her book, to which Mr. Havelock Ellis contributes a preface, is certainly not effective as a presentation of the case for social toleration of an abnormal habit of life, nor is there any evidence that the author holds a brief to this end.

JUNGLE AND MALARIA.

THE idea is widespread in the Federated Malay States that jungle causes malaria and that therefore ravines should be cleared of jungle and secondary growth. The Malaria Advisory Board states, however, in its report for 1927, that this is by no means always true, and many instances are known in which severe outbreaks of malaria have been caused by clearing jungle. An emphatic warning has therefore been issued against indiscriminate felling of jungle, and the attention of the public is invited to the following points: (1) If the health of those living close to a jungle-covered ravine is good, on no account do any clearing. (2) If the health is not good, owing to attacks of malaria, search thoroughly for other possible sources of mosquitoes before blaming the jungle. (3) Do not clear a ravine, unless you are prepared to drain and oil it thoroughly. (4) Sometimes jungle is dangerous, but before felling it you should seek the advice of your medical practitioner. The Health Department will be glad to coöperate with him in this important matter.

The Health Department of the F.M.S. states its willingness to coöperate with the local practitioner in coming to a decision.

REPORT OF THE IMPERIAL SOCIAL HYGIENE CONGRESS.

WE have received from the British Social Hygiene Council a copy of the proceedings of the Imperial Social Hygiene Congress held at Caxton Hall from Oct. 3rd to 7th, 1927. The Congress was reported at some length in our columns at the time (see THE LANCET, 1927, ii., 782, 829); and Mr. Neville Chamberlain in a preface expresses a hope that the record will have a wide circulation amongst those who are working to raise the moral and social standards throughout the Empire. The report deals in succession with the imperial, medical, and administrative aspects of social hygiene; a full index makes it possible to refer rapidly to work recorded in any part of the Empire. The report can be obtained from the Council at Carteret House, Carteret-street, London, S.W. 1.

NEW PREPARATIONS.

Atophan Balsam (Messrs. Schering, Ltd., 3, Lloyd's-avenue, London, E.C. 3. Manufacturers: Schering-Kahlbaum A.G. Berlin, N.39).—The use of atophan in facilitating the elimination of uric acid in gout and rheumatic affections, as well as its value in neuralgia and sciatica, are well known. It is now made in the form of a balsam, being an association of atophan-amylester 10 per cent., phenyl salicylate 10 per cent., and camphor 5 per cent., with a fatty soap base. The balsam can be used externally either per se or as a supplement to internal treatment by atophan. Experiments have shown that the preparation has high absorption qualities, confirmation being given here by the excretion of the components into the urine. The use of the preparation is particularly indicated where local and massage treatment are required simultaneously. It is put up in collapsible tubes. About ½ oz. per day is recommended for use, and the tubes contain about 1¼ oz.

Zymocide (Messrs. Reed and Carnrick, Jersey City, N.J. Agents: Messrs. Coates and Cooper, 41, Great Tower-street, London, E.C. 3).—This is described as an antiseptic consisting of eucalyptol, thymol, menthol, methyl salicylate, boric, and benzoic acids with other aromatic ingredients and alcohol 20 per cent. by volume. It is non-irritating and non-poisonous, and is intended for use as a general antiseptic where it already enjoys popularity as a vaginal douche and a mouth wash. A 25 per cent. solution has been employed for cleansing the eyes following traumatism, and in the treatment of conjunctivitis, blepharitis, catarrh of the lacrymal passages and other ocular inflammations. It is put up in bottles containing 14 fluid ounces.

Robinson's "Patent" Barley in Powder.—Messrs. Keen, Robinson and Co., Ltd., Carrow Works, Norwich, have sent us a specimen of their well-known product, used as a food for infants and for making potable barley water and barley puddings. As a result of suggestions and criticisms from medical men they have now fixed on the tin, in addition to the directions, a table of food recipes specially designed for infants. The table gives in parallel columns the age of the infant for the first four weeks, and thereafter for the first nine months of its life, and the weight in pounds which is recognised as agreeing satisfactorily. Further columns give the quantity of the suggested foods and the number of feeds per day in accordance with the age and weight. A note on this table of recipes pointing out that infants should preferably be fed by weight rather than by age gives advice which might far more frequently be acted upon by the public—viz., that where the weight of an infant does not clearly correspond with the age the medical man should be consulted.

THE BUCKSTON-BROWNE PRIZE.

A CORRESPONDENT asks for details in regard to the Buckston-Browne prize to which he has found a reference in our columns. The prize was founded by Mr. Buckston-Browne, to whom the medical profession is indebted for his generosity in many directions, in memory of a son who lost his life in the war. The interest on a sum of money given for the purpose provides a cheque for £100 and a medal which are given for the best essay on some subject selected by the Council of the Harveian Society. The prize is awarded every two years, the first award having been made in 1927 to the late Mr. Lionel R. Fifield for his essay on new growths of the urinary bladder. An amplification of that excellent essay was reviewed in THE LANCET recently.

A BROCHURE ON TEA.

WE have received from the Mazawattee Tea Company, Ltd., an illustrated booklet setting out the connexion of the company with the history of tea in an interesting manner. Figures are given to show the vast increase in importation of tea which has been accompanied by the dramatic fall in prices, the figures really forming a commentary upon social developments in the United Kingdom during some 250 years. The Mazawattee Tea Company in their pamphlet point out that they were the first firm to bring home to the public that, as dealt with by experts in the fine art of blending, teas grown within the British Empire could present all the qualities which made those of China popular. We do not suppose that anyone who is a real amateur of China tea would suggest that the blends have all the qualities which personally appeal, but the blends are held on good ground to have other qualities which form satisfactory compensation; anyhow, those of this firm have earned their wide reputation.

THE address of the Deutsche Medizinische Wochenschrift is now Berlin W. 30, Viktoria Luise Platz 1.